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Chemical Weekly

VOL. XXXV MAY 1, 1990 NO. 34

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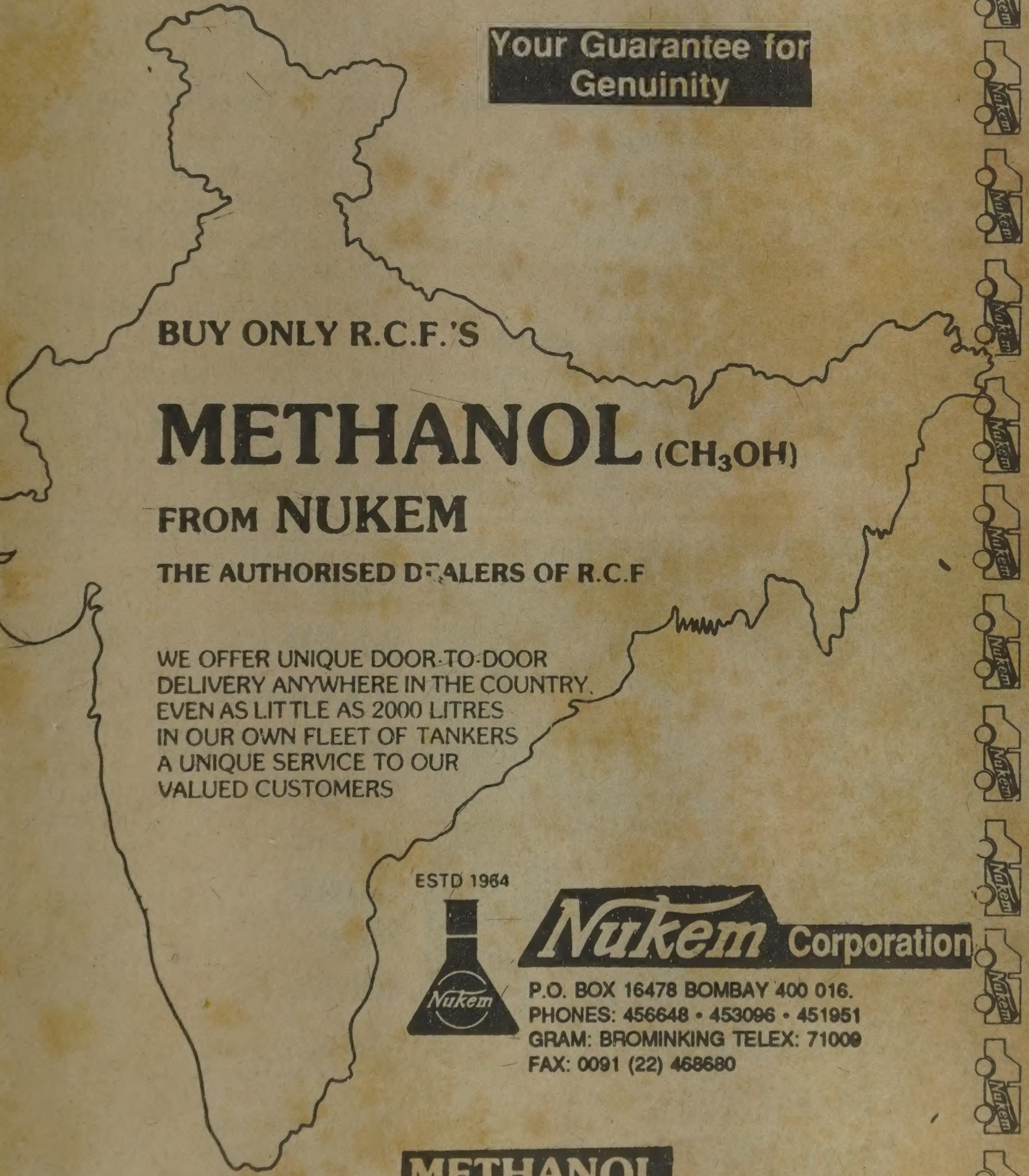

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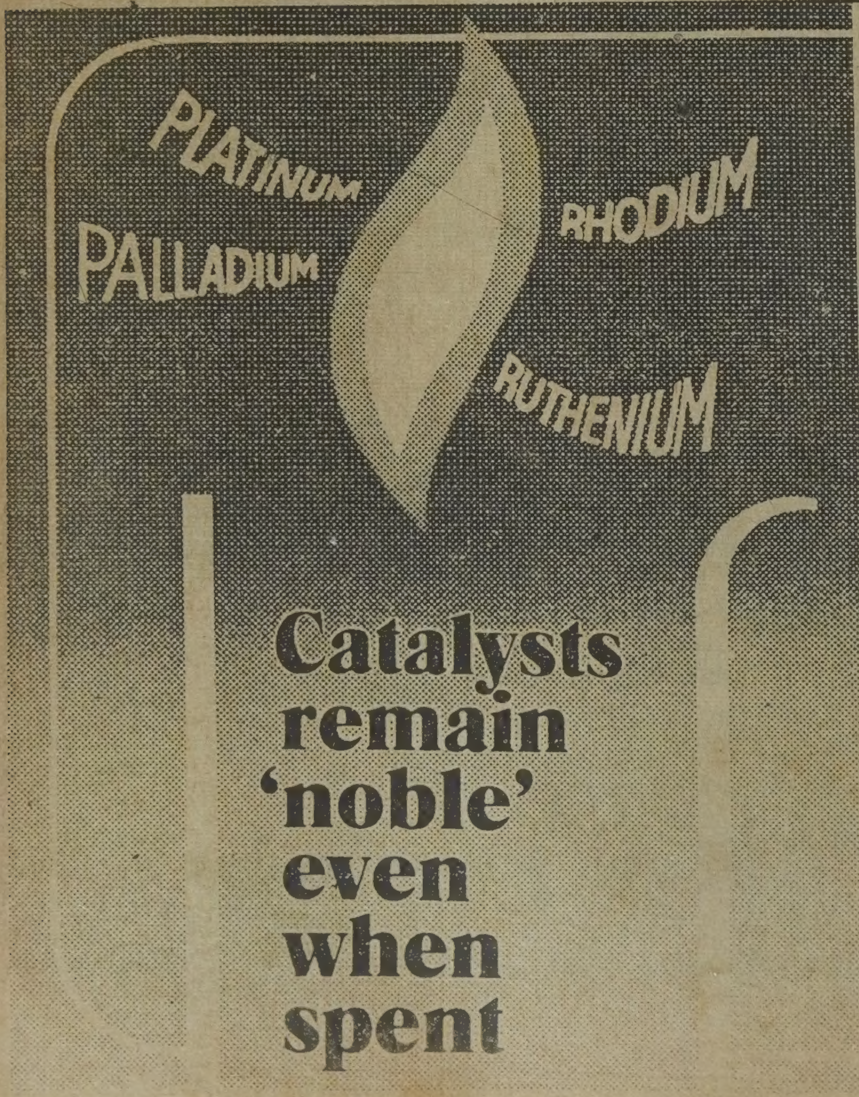

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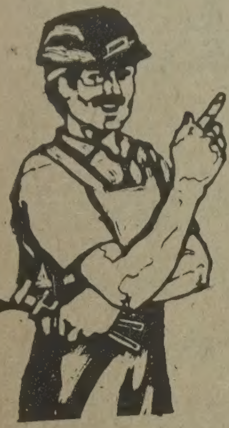

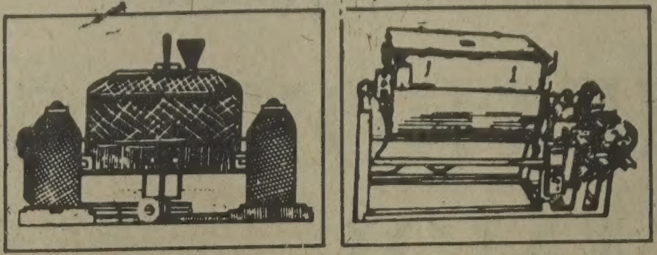

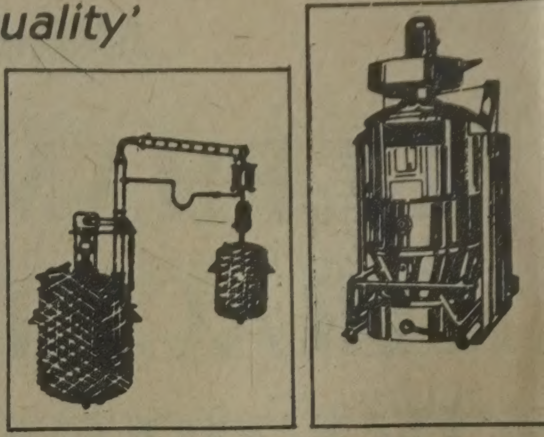

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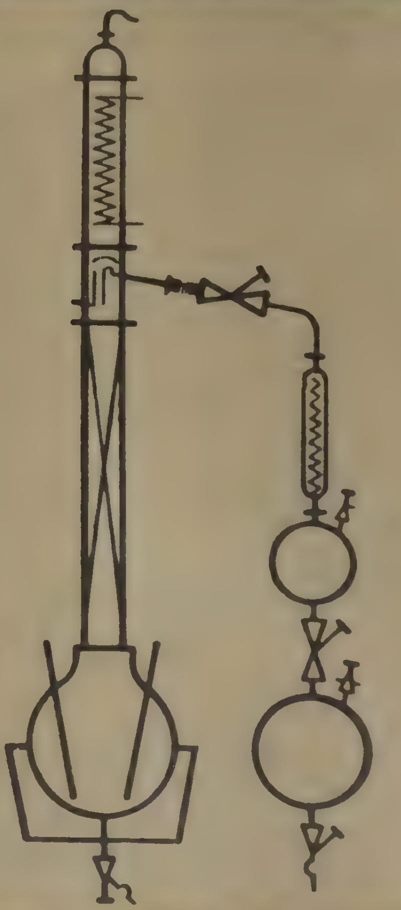

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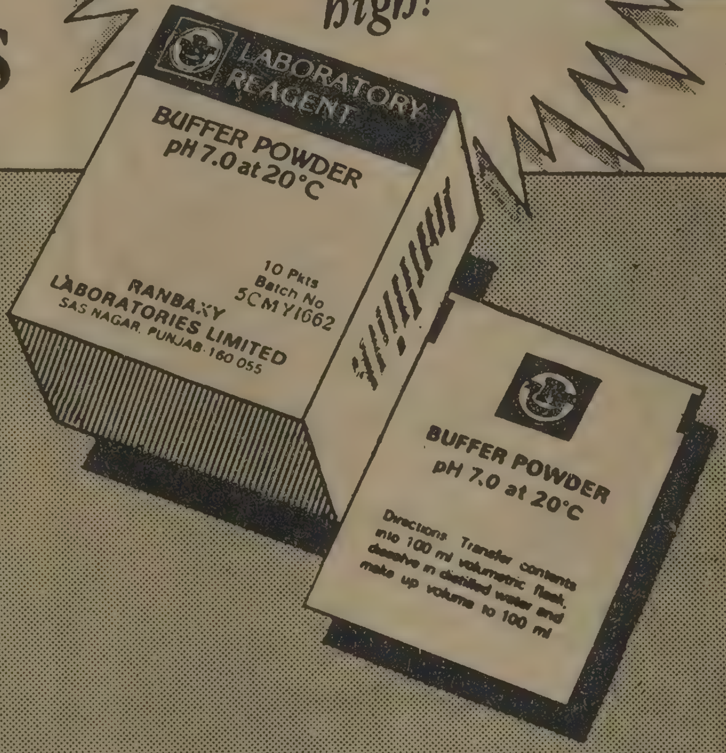
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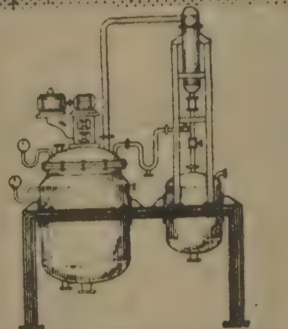

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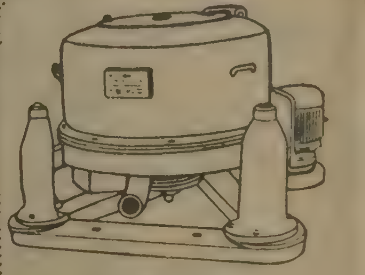

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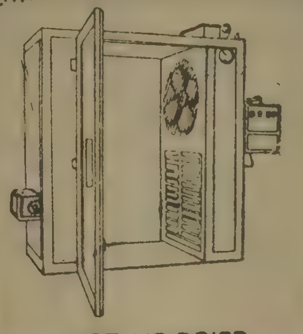

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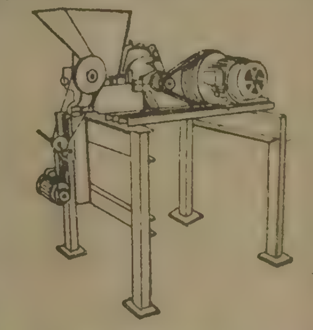

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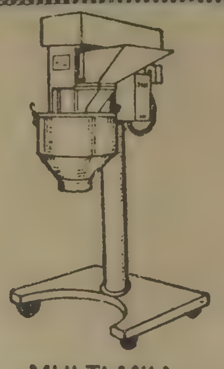

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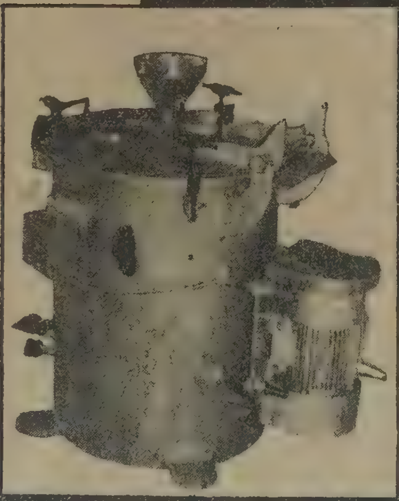

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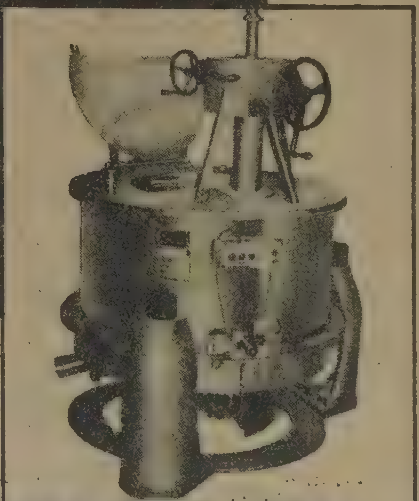

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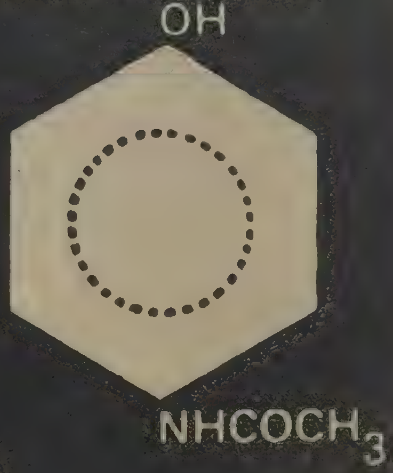

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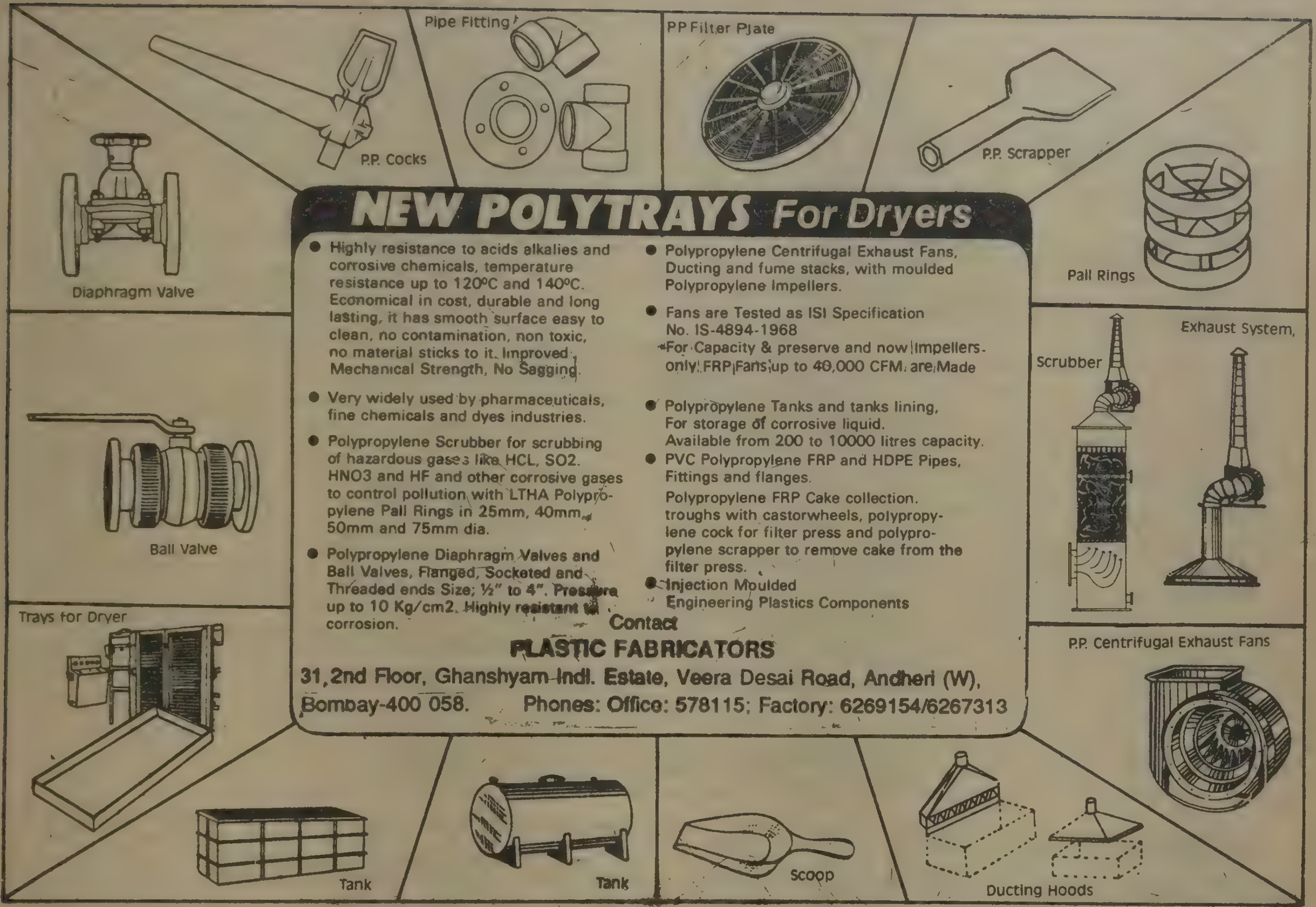

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HERALDING THE 21st CENTURY - 49

Prospects for Natural Gas — AD 2000 and beyond — A countrywise review

Jean Clavel, President of ATG (Association Technique Industry Gas de France) in his global review of Natural Gas prospects say: "The spectacular growth of natural gas reserves throughout the world, and, even more, the proliferation of discoveries in an increasing number of countries, have created considerable development prospects for gas projects at the domestic and international levels.

"While natural gas thus appears to boast limitless resources, its uses also appear to be unlimited. It enjoys access to nearly all energy and petrochemical markets.

"A clean, flexible fuel, easily substituted for petroleum products, and associated with high performance technologies, natural gas offers a vast potential for penetrating energy markets, especially in developing countries."

Mr. Clavel continues: "The present abundance of energy supplies, especially of crude oil, does not particularly encourage a reassessment of the major energy options. However, this affluence could be misleading.

"Oil resources are limited, and the current situation is bound to change in a more or less short term basis. With this in mind, natural gas has become a major source of energy, abundant, efficient and safe. Its participation in the world energy balance is destined to grow further by the end of the century and probably beyond."

Ratio of gas to oil. This review records that despite the slowdown in the growth rate of gas production following the first oil shock in the early 1970s, the ratio of natural gas to oil production grew steadily in favour of gas. This ratio reached a level of about 55% in 1986, in terms of energy equivalent, compared with about 30% in 1970. However, it adds a note of caution: "The growth of natural gas production in the world will not be determined solely by gas resources.

"The growing distance between reserves and the major consumer region, and the rapid growth of gas reserves implying difficult operating conditions cannot but hamper its future growth.

Even more, the growth of world gas production will be conditioned by the opening of gas markets and of its international trade, with vast requirements of equipment and infrastructure from production to the final consumers

"This is especially true in a large number of developing countries with significant and sometimes large resources, but whose gas industry is poorly developed."

The share of gas in meeting world energy needs is currently about 20%. Setting aside the transport sector, in which petroleum products are used nearly exclusively, the share of gas is around 23.5%.

Annual rise. The forecast is for an annual rise of just over 2.4% up to the year 2000. This rise is expected to be steeper than that of primary energy demand, implying that the share of gas should continue to grow, reaching 22% in 10 years.

This moderate increase, says that ATG report, "is nevertheless significant considering that the share of gas has been fluctuating around 20% for the past 10 years." Dealing with regional prospects, the expectation is that the decline in North American consumption in the 15 years up to 2000 could reach 4%. This is in spite of the growth of Canadian demand. It adds that the drop in consumption in the United States should nevertheless slow down significantly.

In Western Europe a 21% growth of overall markets is seen as highly probable. This advance is most likely in new consumer countries of the Mediterranean seaboard and Scandinavia, while growth should be very slow in countries that have reached maturity in their markets. Again, taking the 15-year period up to 2000, higher growth is forecast in Japan (35%) and especially Australia/New Zealand (46%) with the bringing in the recent discoveries and the new transport infrastructures.

Soviet Natural Gas. The growth of gas consumption in Eastern Europe/USSR should be impressive compared with that of Western industrial countries. The expected rise is 15% in the decade and a half up to 2000. Here Soviet natural gas will doubtless play a major role. The most spectacular increases in gas consumption will place in the developing countries. Demand in some countries would more than double in 15 years, according to the ATG publication.

Figures given for anticipated rises include South-East Asia (175%), followed by Africa (123%), the Middle East (77%) and Latin America (63%), which is already said to be demonstrating a degree of maturity in its gas markets.

The study features a separate section of international trade, saying in its introduction that the widening geographic distance between the gas resources and the consumer regions will inevitably lead to the expansion of international trade in natural gas. This is expected to increase by 65% up to the turn of the century.

Costly to transport. Natural gas still remains a relatively expensive energy to transport over long distances, both due to self-consumption and the capital investment required for its transport. This heavily penalises international movements of natural gas in the form of LNG (liquefied natural gas). The forecast is that despite the substantial increase in international trade, LNG will account for only around 25% in 10 years, the same as at present.

Looking at North America, the survey concludes that the import of Canadian gas by the United States, the only significant intra-continental trade flow, could rise by over 60%.

Latin America is not seen as a significant growth area for international trade. The export of some 2 bcm a year from Bolivia to Argentina is the only trade flow at present. Possible future projects, it suggested, are from Argentina to Chile, Uruguay and Brazil. Negotiations for Bolivian deliveries to Brazil have been reported.

Western Europe is regarded as the ideal field for a broad expansion of international gas trade. With the exception of Denmark, which is a small gas exporter to West Germany and Sweden, only the Netherlands and Norway supply the intra-European trade.

The Netherlands has been massively involved in this activity for more than 20 years. Its exports, which have been declining slowly since the late 1970s, are expected to stabilise around 19 to 20 Mtoe by the end of the century.

Intra-European Trade. Norway is gradually taking over the role of the Netherlands in intra-European trade, thus making it possible to confine Europe's foreign gas dependence within reasonable limits.

By the year 2000, the new generation of gas fields brought in during the 1990s (Sleipner and Troll) will, together with the older declining production, maintain an export level of about 20 Mtoe, according to the study. Increasing dependence by some countries in Western Europe on supplies from Algeria and the USSR (and Libya, to a lesser degree) is also mentioned.

The USSR, faced with a levelling off, or even decline of its oil production, will be trying to boost its gas exports to western industrial countries. Already Soviet gas virtually satisfies the energy needs of its Eastern European neighbours.

Africa is also a region potentially destined to supply intercontinental. At present the only cross-border pipeline is between Algeria and Libya.

A further project, thought unlikely to be completed by 2000, is a pipeline connecting Nigeria to Benin, Togo and Ghana.

Turning to the Middle East, the study found that only four countries have demonstrated an interest in external marketing of their gas, and only two are already involved in this activity. Abu Dhabi exports LNG to Japan, and Iraq to its neighbour Kuwait.

Potential exporters. Other potential exporters in the Middle East are Qatar (in the form of LNG) and Iran. Internal problems have prevented Iran, which has the world's second biggest gas reserves, from taking advantage of these. However, recent discussions have raised the possibility of a pipeline to Western Europe, via Turkey, Greece and the Balkans.

The area described as Asia/Oceania (excluding Japan, which receives around 75% of world LNG exports) is said to reveal an impressive contrast between gas-rich countries and countries which are totally or virtually devoid of gas reserves but which, due to their population or their level of economic development, represent big potential markets.

Among these are South Korea, Taiwan and Singapore, the newly industrialised countries of South-East Asia.

South Korea received its first deliveries of Indonesian LNG in 1986, essentially to generate electricity and replace its manufactured gas. The present contract is set to more than double in 2000.

Taiwan will also become a customer for Indonesian LNG this year and Singapore will receive Malaysian gas to supply a thermal power plant.

In North America, there has been a move away from pipeline companies buying gas for resale to distribution companies and large customers towards pipelines simply operating as transporters of gas for others and charging a tariff for gas carriage. This move is linked to the retreat from the long-term contracts and the developments of a large and active spot market in gas. While these concepts have not been adopted in Europe to anything like the same extent, the UK legislation provides access for third parties to the British Gas pipeline system if they so wish, and the European Commission is considering the applicability of this type of legislation elsewhere in Europe.

Fourth, and last of these factors likely to influence the shape and international dimension of the natural gas industry, is that of economics. There are many developing countries in the world in which enormous economic progress is needed to bring their populations upto standards close to those enjoyed by the developed economies. The call for more energy as a result will be substantial. In addition, population growth in many developing countries will result in higher demand in all applications, but particularly for natural gas used as a feedstock in fertiliser manufacture.

Above all though, the most important economic factor that will affect the future supply and demand of gas will, not surprisingly, be its future price. Historically this has been linked to the price of crude oil. However, there is a growing perception within the gas industry that perhaps it would be better served if this link were not so strong, because in many markets for gas, oil is not actually the main competitor. In future it is likely that the increasing number of gas supply sources could serve to weaken this link, and perhaps we are already starting to see the start of this in some of the more recent gas purchase contracts.

In the chapter on prospects for 2020, the study predicts that LNG will most likely reappear in the first decades of the next century as the necessary pathway to the world-wide opening of the gas markets and of its intercontinental trade.

It concludes: "The expansion of transported volumes, the proliferation of trade flows, the increase in the number of parties involved -- exporters and importers -- and the diversification of contractual forms are the prospects that will undoubtedly emerge for the international gas commerce in the first decades of the next century."

— T.P.S. RAJAN

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S.L. VENKITESWARAN

MEG -- unequal battle?

Ethyl Alcohol-based chemicals have advantages for oxygenates like the acetyl group of chemicals over production from petro-based feedstocks. But the economies for chemicals via ethylene from alcohol are somewhat uncertain. This is more so when ethylene is converted into polyethylenes. Where ethylene is converted into chemicals by reaction with benzene or chlorine into ethyl benzene or vinyl chloride the viability depends more on the cost of the co-raw material. The recognised advantages of smaller capacity operation may not be so pronounced. In the case of ethylene oxide this handicap is more pronounced even though there is a co-raw material oxygen -- because the contribution of this is far less than in the case of benzene or chlorine and moreover the conversion efficiency is lower. For a chemical like ethylene glycol via ethylene oxide from ethyl alcohol the battle is somewhat unequal for plants of 20,000 to 30,000 tonnes a year against plants of 100,000 tonnes a year based on petro-ethylene. There is an additional handicap where there is no integrated production of alcohol for direct conversion whereas the petro-based operation is fully integrated with ethylene production.

MEG which has been riding on high prices for over two years reaching even $1200 per tonne has suddenly dropped to the level of $350 or so -- a dumping price from Saudi Arabian production. This has caused serious problems for the Indian producers, more so for the production based on ethyl alcohol. While the $350 level is a temporary measure the international prices may remain in the $500 to $650 range. Customs duty at 115% results in a landed cost of below Rs. 20,000/tonne. This could go up to Rs. 24,000/tonne if duty is at 150% level. Imports are under OGL and gap between demand of 100,000 tonnes and production by IPCL, NOCIL and now India Glycols is over 50,000 tonnes. The domestic product has been priced at Rs. 27,000/tonne and the recent dumping by SABIC has left large stocks unlifted with the Indian producers.

A fair domestic price of Rs. 24,000 may perhaps be acceptable and while this is good enough for IPCL's old plant in Baroda it may not be workable for the India Glycol production or even the production of MGCC Complex with its 100,000 tonnes a year capacity. The high price era of over Rs. 30,000/tonne of MEG in India is over and the policy of encouraging wider use of polyester cannot be based on such shaky foundations. Our import duty levels are often exhorbitant and unjustified and this creates misgivings such as the evocation of Super 301 by US.

There is need for a policy which ensures reasonable price levels for the intermediates for polyester -- PTA, DMT and MEG -- and of course the parent item of para xylene for PTA/DMT. The chemical excise levies at various levels from base raw material to the finished yarn or apparel are always criticised from one end or other. The selective treatment for handloom is another example. While there is a policy reorientation it has to be further toned up. But these are issues outside of the objective of this piece which is only on the unequal battle between MEG from alcohol and from petro-ethylene. It is reported that the MGCC cracker may have to price MEG at Rs. 26,000/tonne which may be adequate for production of India Glycols as well in a situation of near balance between demand and production. The newer plants of about 100,000 TPA by Reliance Petrochemicals and by NOCIL after expansion are on the horizon besides SM glycol's project for 40,000 TPA based on alcohol. But there is a 200,000 tpa plant on the anvil in Saudi Arabia for start-up in 1992 besides more capacity elsewhere.

IPCL and NOCIL have been following a policy of higher prices for ethylene oxide relative to MEG and as import of ethylene oxide is costly and hazardous users have no option. It is most likely that this situation will persist and ethylene oxide will always be priced at higher levels than the equivalent of MEG. The smaller capacity plants of MEG based on alcohol will face a tough time against production by the much larger petro-based integrated plants and the small advantage of perhaps Rs. 2 per kg. of ethylene from alcohol over petro ethylene will be wiped out by the advantage of scaled up capacity for the latter. Capacity of alcohol-based production cannot be increased and even the 40,000 TPA level seems very doubtful as transport of alcohol over longer distances will wipe out the advantage in cost of ethylene.

There are however good prospects for captive production of ethylene oxide for making derivatives other than glycols. Such programmes can be linked to a smaller ethylene oxide capacity of say 10,000 to 15,000 TPA and would not have to face serious competition from production based on purchased ethylene oxide. No doubt the producer of ethylene oxide from the petro-base has also this option if permitted by Government. It is necessary for some clear analysis of the alternatives for an alcohol-based ethylene project and appropriate decisions. Programmes for using ethyl alcohol for basic chemicals should not have to face uncertainties on raw material or an unequal fight for market share. Incidentally there is an alternative way of making MEG from ethylene without going through ethylene oxide -- using peracetic acid as oxidiser and with a bonus of acetic acid as co-product.

Oil Demand Growth

The demand for petroleum in developing countries is growing 60% faster than total world demand and four times the US rate. Estimates show a rise of 2.5% for 1989 in the free world countries to 52.4 MM bpd (million barrels per day). Half of this is of LDCs. The Far East alone shows 4% higher as against 1% for USA and over 9% for India. Demand for 1989-1995 period is projected at 25% higher in LDC's reaching 17.4 MM bpd.

World oil supply/demand upto AD 2000 is forecast in a new study. Production capacity will grow to 76 MM bpd in 1995 and remain nearly constant till 2000 -- only 5 MM bpd over the next decade. If OPEC opts for production increases it could add 7.5 MM bpd while the non OPEC capacity will decline by 3 MM bpd.

On the whole production and supplies from OPEC will match the demand but at what price? This is the crucial question for this decade for countries dependent upon imports for a good part of their demand. Asia-Pacific countries exhibit the strongest growth rates over this period and this is a mix of high growth in the LDC's and lower rates in countries like Japan.

Non-OPEC countries can maintain production only at higher price levels than the Middle East or Mexico and so long as the Middle East particularly Saudi Arabia chooses not to dump excess production on others the steady rise in oil prices over this decade is the expectation of most critical analysts. The price levels will necessarily determine export demand and low-price scenarios of the early eighties may not prevail. OPEC countries dominate with the bulk of world reserves estimated at 900 billion barrels with Mexico, China and Norway referred to as shadow-OPEC countries as a distant second.

So with our steady high growth in oil consumption there may not be difficulties in procuring supplies from our close neighbours -- Middle East -- if the price is within affordable limits. Price expectations are $29-30 a barrel in 1995 and India's problems are going to be pretty disastrous unless there is a deliberate policy of curbs on consumption. The euphoria over export growth and policy oriented towards such growth is welcome but this is not going to solve our predicament on balance of payments in the Nineties. The latest estimates show a 38% growth of exports and 26% growth of imports in the first ten months of 89-90 leaving a deficit in trade of Rs. 6,890 crores, just nominally below Rs. 6,997 crores of last year. The invisibles have also declined. The import of oil is likely to go over Rs. 10,000 crores in 1994-95 and this will certainly create very serious balance of payment problem for India.

It is interesting to read the comments of Mr. M.V. Kamath -- against the general trend of commentators -- against petroleum's exacting price and welcoming PM's stand for tough measures including rationing if required. No doubt we have one of the lowest per capita use of oil and of automobiles or of energy use per capita. The price of petrol in India is the highest in the world but the price of diesel and kerosene, the largest areas of petroleum demand, are on par with many other countries. Are we in for a renewed emphasis on rickshaws even if they are cycle rickshaws in the towns and cities? May be such an eventuality may not arise if there is appropriate policy framework to keep the growth rates for oil demand under effective control.

Improved catalyst for methanol

ICI of UK have come up with a "third generation" improved catalyst for methanol by their Low Pressure Technology. This is also based on copper and referred to as Catalyst 51-3 and claims to have 10-15% higher activity, same selectivity and 50% longer life. The net result is a higher capacity of existing plant if there are no bottlenecks in other areas. The catalyst 51-3 has already been tried out in ICI's own plant at Billingham, UK for nearly five years. Orders for two plants based on this is on hand. Ever since ICI came up with their breakthrough in methanol under low pressure (50 atmospheres) they have cornered 43 plants so far and account for 65% of world production.

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DRUGS PACKING MATERIAL

Move to bring down price ceiling

The Union Ministry of Petroleum and Chemicals is believed to have asked the Bureau of Industrial Costs and Prices (BICP) to revise price ceilings on packaging material for drugs and pharmaceuticals in an attempt to roll them back to levels prevailing before May 1989, when the ceilings were last moved upwards.

With this exercise, the ministry will be able to scale down price increases for pharmaceutical products, for which hundreds of applications have been piling up since October last year. The May 1989 revision of permissible packaging material costs, which came after a gap of about eight years, granted increases of between 30 per cent and 40 per cent.

"The government is trying to artificially bring down prices of drugs and pharmaceuticals with this move", says an industry insider. Packaging material costs, especially for kraft paper, aluminium foil, duplex boards, glass bottles and rubber plugs, have increased by between 40 per cent and 75 per cent over the past five years, according to him. Between May 1989 and now, the prices of these materials are said to have increased by as much as 15 per cent.

Industry sources are not in a position to gauge the likely impact of the fresh revision of packaging material norms by the BICP, as even the May 1989 revisions have not been made public. The only indications that are available from price revisions granted to some companies on the basis of the May 1989 norms, before October 1989.

In any price revision, the variable factors are costs of raw materials, conversion charges, packaging material costs, and packaging (labour) costs. The norms for conversion charges and packaging costs were last revised in February 1989 on the basis of recommendations made by a committee headed by Dr. D.K. Sankaran, the then director in the Department of Chemicals and Petrochemicals.

The committee, which studied cost data submitted by about 25 companies, is believed to have recommended large increases in conversion norms over the earlier norms that were fixed in 1974, to be implemented in a phased manner. The increase in the first phase, which is believed to be in the region of 50 per cent, was to have been followed up with a further increase around August 1989. Industry sources complain that even the first increase has not run its course, and there is no word as yet about the next phase of revisions in conversion norms.

MCF LIKELY TO BE OPERATIONAL BY EARLY JUNE

The Mangalore Chemicals and Fertilisers (MCF), remaining closed since April 1, due to acute shortage of water, is likely to become operational only during the first week of June.

The company's Chairman and Managing Director, Mr. J. Alexander, told the press that MCF requires about two million units (m.u.) of water per day to keep the plant going.

The Mangalore city is getting 11 m.u. of water per day. Of this, seven m.u. goes to the city, two m.u. to Kudremukh plant, Mangalore port etc., and the rest to MCF.

The working condition at MCF plant became critical when the water supply level in the city went down to 3-4 m.u. a day during the last week of March. It was then that the company officials decided to close down its operations. MCF will get its share of water only during June. At present, the water supply in Mangalore is two m.u. per day.

Mr. Alexander said it is not viable to run the plant for four days and close it as the burning of naphtha each time will cost us Rs. 40 lakhs. Hence, it was decided to keep the plant idle till end-May.

Meanwhile, Mr. Vijay Mallya visited the MCF office in Bangalore recently. The visit assumes significance in the wake of reports that Mr. Mallya is planning to take over the reins of MCF.

ESSAR GUJARAT: TRIAL OUTPUT BEGINS AT HAZIRA

Essar Gujarat Ltd. has started trial production at its 8.8 lakh tonne capacity hot briquetted sponge iron project at Hazira in Gujarat, from the third week of March.

Production, which was started in the first module of the plant, is said to be equivalent to 65 per cent capacity utilisation. The second module is likely to be put on trial production by May-end, soon after which both the modules will go into commercial production.

While commissioning of the plant will stick to the original time schedule, there has been a substantial cost overrun of about Rs. 60 crores, at the current cost of Rs. 366 crores. The cost escalation is claimed to be mainly on account of exchange fluctuations, and costs incurred in unanticipated replacements of some parts in the second-hand plant.

OIL CHIEF RETIRES

Mr. Surajit Chaliha retired on April 23 on superannuation as Chairman, and Managing Director of the Government-owned Oil India Ltd. (OIL) after 35 years of distinguished service to the oil industry.

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New industrial policy for Gujarat in May

The Chief Minister of Gujarat Mr. Chimanbhai Patel declared at Ahmedabad that the new industrial policy of the State Government will be announced before May 15. The State Industries Minister was busy in preparing the new policy, he added.

Mr. Patel was speaking at a function organised by the Gujarat Journalists Union to facilitate the new ministry of Gujarat. He assured that with a view to avoid delay, the State Government had decided to give reply within 30 days to the application of the entrepreneurs whether positive or negative.

The Chief Minister pointed out that several entrepreneurs were eager for setting up projects in Gujarat. Such industrialists should not have the feeling to go back because of cold approach by the State authority, he added.

He made it clear that the industrial policy of the State Government will be employment-oriented. Mr. Patel disclosed that the Prime Minister, Mr. V.P. Singh had assured him that a formula will be evolved so that the State Government would not have to beg before the Centre either for crude oil royalty or for the price of natural gas.

Meanwhile, the Gujarat Government has imposed a fresh burden to the tune of Rs. 500 crores per annum in industries at one stroke. The decision to replace Section 15-B of the Gujarat Sales Tax Act 1969 by a special ordinance has created hue and cry among industrialists.

All industries and more particularly chemical and pharmaceutical industries will be hit hard as they have now to pay retrospectively purchase tax on all raw materials, processing materials and consumable stores which are purchased from Gujarat dealers except purchases of declared goods, when the goods are purchased for the manufacture of taxable goods for sale.

This not only defeats the very purpose of single point levy but will also divert the trade of Gujarat to adjoining States as all manufacturing units will purchase their raw materials from outside eventually leading to sizeable revenue loss to Gujarat.

It is estimated that this ordinance will burden the industrial sector to the tune of above Rs. 500 crores per year and majority of industries will have no other alternative but to close down their shutters. Thus this measure will prove to be suicidal for the industries and trade of Gujarat.

ASSOCHAM STEPS TO FURTHER LIBERALISATION

Raising the MRTP limit of private companies, the 40 per cent ceiling on foreign equity participation and the investment level requiring intervention by the Cabinet Committee are some of the recommendations the Associated Chambers of Commerce and Industry (ASSOCHAM) has made to further the process of liberalisation.

In a study "Deregulation: Forward march", ASSOCHAM has said the MRTP limit should be raised to Rs. 500 crores. At present, projects with an investment of over Rs. 50 crores need the final approval of the Cabinet Committee. This should be made applicable only to projects involving an outlay of between Rs. 50 crores and Rs. 100 crores. Foreign equity, which has a ceiling of 40 per cent now, should be allowed to be raised to 51 per cent.

There is a need to raise the MRTP limit for companies as the costs of indigenous and imported machinery have been increasing at the rate of 10 per cent and 15-20 per cent, respectively, every year. Also, in 1986 capital expenditure on projects costing Rs. 100 crores and over comprised 74 per cent of the total investment in new projects.

It has also been seen, the study says, that a 'viable' petrochemical plant would cost Rs. 700-900 crores. A 'viable' fertiliser plant would cost Rs. 500-1,000 crores. The present set of rules and regulations governing expansion are so complicated as to make either expansion or diversification not worth.

HARI OM ASHRAM DONATION TO ATIRA

ATIRA has received a donation of Rs. 50,000 from the Hari Om Ashram, Nadiad to institute an Annual Award for the most outstanding scientific or technological contribution in India in various fields of textile sciences, such as textile technology, textile chemistry, synthesis of dyestuffs, fibre science and designing of textile machinery. The award will be named "Hari Om Ashram Prerit Ranchhodlal Chhotalal C.I.E. Research Award Endowment".

1. Scientific/Technical achievement in textile technology, textile chemistry, synthesis of dyestuffs, fibre science and designing of textile machinery;

2. Solution of short-term critical problems facing the textile industry;

3. Process/Product development of commercial value to the Indian textile industry (Product would include machinery and instruments);

4. Outstanding contributions towards the scientific understanding of important phenomena in textile manufacture.

A Board of Trustees and experts committee have been constituted for the administration of the Award Scheme. Detailed information with application forms will be available from the Director, Ahmedabad Textile Industry's Research Association, Post Polytechnic, Ahmedabad 380 015. Last date for receiving completed applications is 30th June 1990.

IBRD to consider ecology fund

The World Bank will consider establishing a $770 million fund to help developing nations join the attack on global warming and other worldwide environmental problems, bank officials said on April 24.

The fund, which has been proposed by France, will provide low-cost financing to Third World nations for reforestation and other projects that would help improve global conservation. "It's a fund to tackle global issues in the environment", said a French official, who declined to be identified.

Paris has already promised to contribute 900 million French francs ($160 million) over three years to the project and has called on other industrial nations to join it. "Developing countries are not going to commit themselves to pollution reduction unless they receive concessional (below market-rate) funds", the French official said.

The French proposal is on the agenda for the semi-annual meeting of the World Bank's development committee early this month. Some officials expressed doubts that it would be approved at that time.

West Germany is likely to back the proposal, but other industrial nations have raised questions about how the fund would work. Some of them believe that what Third World nations mainly need are stricter pollution regulations, not more money.

As envisioned by France, the fund would be worth more than $770 million and would help developing nations join multilateral efforts to clean up the world's environment, such as the Montreal protocol.

That pact, signed in 1987 by 36 countries and the European community, calls for a 50 per cent cut by 1998 in production and use of chlorofluorocarbons (CFC) — chemicals which eat away the ozone layer that shields the earth from cancer-causing ultraviolet rays.

Other potential projects might include plans to clean up international waters such as the Mediterranean basin and attack other pollution problems that affect more than one country.

French officials said the World Bank would have to work closely with the United Nations in deciding how to distribute the money.

He added that the proposed fund would be operated flexibly to allow donor nations to participate in different ways, including earmarking their money for certain purposes.

French officials insisted that the proposal has widespread support, and that the only question was when the plan would be approved, not whether. Bank officials said the French plan is based on a proposal by the world resources institute, a Washington-based think-tank on the environment.

In a report last September, the institute advocated for the establishment a three-billion-dollar international environmental facility for the preparation and financing of conservation projects over the next five years.

FERTILISER TO BE IMPORTED

The Government proposes to import both phosphatic and potassic fertiliser this year to bridge the gap between the demand and supply, the Food and Civil Supplies Minister, Mr. Nathu Ram Mirdha, informed the Lok Sabha on Ap. 26.

NEW ED FOR GNFC

Mr. N. Balasubrahmanyam has joined Gujarat Narmada Valley Fertilisers Company Ltd. (GNFC), Bharuch, as Executive Director (Finance).

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Chemicals exports may touch Rs. 1,300 cr.

Exports of chemicals, agro-chemicals and dyestuffs are expected to touch Rs. 1,300 crores in 1989-90 as against Rs. 780 crores in 1988-89. This shows a progressive increase from Rs. 60 crores in 1983-84, an official press release said at New Delhi on April 21.

The pharmaceutical sector, which achieved an all-time high export of Rs. 467.50 crores in 1988-89, is expected to reach Rs. 600 crores in 1989-90. The total exports of this sector in 1983-84 stood at Rs. 162 crores, according to the annual report of the Department of Chemicals and Petrochemicals in the Ministry of Petroleum and Chemicals.

The report also says that in the pharmaceutical sector, a perspective export plan for 15 years has been formulated and it is expected to increase exports substantially. The production of drugs and pharmaceuticals also continued to show an upward trend. As against production of Rs. 355 crores of bulk drugs and Rs. 1,760 crores of formulations in 1983-84, their production in 1989-90 is estimated to be around Rs. 610 crores and Rs. 3,360 crores, respectively.

The increased production of essential drugs has facilitated the fulfilment of the national goal of ensuring easy availability of good quality essential drugs at reasonable prices to the common man, the report said.

According to the report, the country has become self-sufficient in almost all major heavy chemicals. The installed capacities of methanol and phenol have almost trebled from the level of 1984-85. The production of pesticides is steadily increasing and imports had gone down progressively during the last three years.

Petrochemicals, which is a thrust area, has made rapid strides during the last five years in domestic production. In the case of synthetic fibres, not only has the country attained self-sufficiency but also reached a position to export significant quantities of these items, the report added.

RPG STEPS UP ACTIVITY ON OLEFINS EOU

Mr. R.P. Goenka has stepped up activity on the 100 per cent export-oriented olefins project in technical and equity collaboration with Linde AG, West Germany.

In about 60 days from now the detailed project report will be written up and presented to the Government for final clearance.

RPG Enterprises along with other group companies are being involved in the Rs. 1,300 crore project to be set up at Manali in Madras, with RPG and Linde holding 25 per cent each of the equity with the rest for the public. The debt-equity ratio is put at 4:1.

For Mr. R.P. Goenka, the project is prestigious having lost out to Mr. Darbari Seth of Tatas in Haldia Petrochem. Mr. Goenka is keen on getting the work started on the project at least by the end of the year and finish the project in about 30 months.

Talks are on with Linde and other foreign buyers to sell down-stream products, which are also being identified, with an eye to the future demand.

AIDC RECEIVES LI FOR PESTICIDES PLANT

The Assam Industrial Development Corporation (AIDC), a fully-owned state government apex agency for promotion and development of large and medium industries in Assam, has received a letter of intent (LI) for setting up a pesticides plant in the state. This Rs. 40-crore project will be set up in the joint sector. This was revealed by the Assam Industries Minister, Mr. Gunin Hazarika in his presidential speech at the inauguration of the silver jubilee functions of the AIDC.

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FAILURE TO CONTROL POLLUTION

HC orders closure of 10 industrial units in AP

Industries in Andhra Pradesh are finally having to pay dearly for ignoring environmental concerns. In the toughest action taken so far the high court has ordered the closure of ten units on the outskirts of Hyderabad and put another 15 on notice for failing to take the stipulated measures to control pollution and turning the area into a "mini Chernobyl". The ten industries affected are all drugs and chemical units located in the Bolarum industrial estate. The high court order which has made industrialists sit up and take notice states that the industries would be allowed to reopen only after they construct a common effluent treatment plant and make it operational. They also have to satisfy the pollution control board about the adequacy and efficacy of the plant to treat the effluents from their factories before they resume operations again.

Pollution control officials have expressed satisfaction at the decision saying the normally long legal delays in bringing offending industries to book was responsible for the high level of pollution in the twin cities of Hyderabad and Secunderabad. A senior official of the board said that since the Environmental Protection Act came into force in 1986 we have issued notices to 400 industries and cases against 45 are pending in the courts. Our greatest problem is that polluting industries go to court and get a stay order. As the cases take years to dispose of the industries go on polluting. Almost 95 per cent of the industrialists involved have shown no sense of social responsibility.

Some attempt to control the problem was made a couple of years ago with the AP Industrial Infrastructure Corporation (APIIC) promoting the unique concept of common effluent treatment plants to treat the discharge from the most heavily polluting units in two of the larger industrial estates at Jeedimetla and Patancheru.

The pollution control board estimates that 60 of the 250 units at Patancheru, 25 of the 45 indusries in Bolarum and 60 at Jeedimetla (total 250) are hazardous to the environment. While the majority are drugs and chemicals manufacturers there, there is a fair sprinkling of other industries like cement, distilleries, tanneries and alloy makers.

In ordering the closure of the ten industries at Bolarum, a division bench observed that it was not the court which was closing the industries as orders of closure had already been passed by the government. These orders had been challenged by the industries and the court in disposing of the cases earlier had made some interim stipulations about the disposal of effluents and also set a time limit of March 30 this year for constructing a common effluent treatment plant.

However as no serious effort was made by the polluting industries to complete the treatment plant the court was constrained to close the industries, it said.

Noting that the situation in the area had assumed alarming proportions, the bench said the surface water as well as the ground water in the area covering around 15 villages had become 'thoroughly unfit' for human consumption. The land too had become unfit for raising crops and cattle were reported to be dying by the dozen through drinking contaminated water and grazing on polluted grass, a "mini Chernobyl".

The bench also appointed a committee of experts to visit 15 industries in Patancheru and Rudraram industrial estates and verify whether the pollution control measures stipulated by the government had been complied with. Giving the committee a fortnight to complete its task the court warned of serious consequences if any of the listed industries refused to cooperate in the process of verification and inspection. Such industries would be closed forthwith, it said.

With pollution by industries becoming a prime area of concern for environmental groups and the authorities, the pollution control board said it was scrutinising all new proposals carefully. An official said the biggest project under examination in this regard was Essar Gujarat's iron ore plant at Kakinada. Replying to questions in the Assembly a government spokesman clarified that permission for the Rs. 1,000 crore project would be given only after clearance from the pollution control board.

FERTILISER SALE FOR INDUSTRIAL USE RATIONALISED

Fertilisers excepting calcium ammonium nitrate (CAN) will now be allocated for three years at a time for sale for industrial use. The allocations can, however, be changed, if so required, inter alia to meet the requirements of the agriculture sector in case there is shortage of any particular fertiliser. The Government had been considering for some time the rationalisation of the procedure for permitting fertiliser sale for industrial use to avoid delays and unnecessary paper work.

Under the existing system, allocation is given for short period. The changes, the Government hopes, will eliminate time-consuming efforts for the user industries to obtain their requirements locally.

As per the Clause 25 of the Fertiliser Control Order, no person except with the prior permission of the Union Govt. can sell or use the fertiliser for purposes other than the fertilisation of soils and increasing productivity of crops.

IPCL fears glut in DMT, LAB

Indian Petrochemicals Corporation Limited (IPCL) apprehends glut in respect of three of its products, namely, LAB (linear alkyl benzene), acrylic fibre and DMT (dimethyl terephthalate) and therefore proposes to launch special marketing drive in the current financial year.

The total availability of LAB in the current financial year is estimated at 180,000 to 200,000 tonnes while the demand in the same period is unlikely to exceed 140,000 tonnes, according to IPCL sources. Reliance is another major producer of LAB.

The oversupply in acrylic fibre is because of the increased production of existing plants of IPCL and JK and the commissioning of a new private sector plant. IPCL's production of acrylic fibre is to increase to 24,000 tonnes in the current financial year from the last year's 17,000 tonnes. Similarly, the production of the JK's plant is slated to rise from last year's level of 15,000 tonnes to around 22,000 tonnes.

Pashupati Acrylon, the private sector firm with a capacity of 12,000 tonnes, is due to start production soon. However, the demand for acrylic fibre in the current financial year, it is felt, is unlikely to exceed 40,000 tonnes.

As for DMT, IPCL sources point out, the problem is not so much of excess supply as of pricing and costing. As already reported, the Bureau of Industrial Costs and Prices is currently working out afresh the production cost of paaraxylene, a raw material for making DMT and PTA (purified terephthalic acid), by IPCL.

Asked if IPCL wasn't concerned over the prospect of excess supply of MEG (mono ethylene glycol), the sources ruled out the possibility of any such problem, at least in near future. The demand for MEG is currently estimated at 100,000 tonnes against the availability of about 35,000 tonnes.

IPCL's own production of MEG is expected to rise substantially as soon as the 50,000-tonne capacity MEG plant of the Maharashtra gas cracker complex goes into production. MGCC's cracker plant is to be commissioned by early May and all downstream projects within the next few months.

The sources, however, concede that with the commissioning of several other plants in future which have been licensed to produce MEG, the problem of overcapacity might arise at some later stage.

PESTICIDE UNITS UPSET OVER SBI MOVE

State Bank of India has discontinued the practice of giving concessional loans to small-scale pesticide formulators.

Small-scale units manufacturing agro-essential inputs used by the farmers and industries classified as priority industry are entitled to concessional interest according to rules.

In a letter to the Reserve Bank, the Pesticide Formulators Association of India has complained that the State Bank action will hurt the interests of small-scale formulators. Pesticides are classified as an essential commodity and pesticide industry has been designated a priority industry.

In the recent budget, the Government has given various concessions like reduction of customs duty and excise duty to help farmers to purchase important pesticides at affordable prices. "The recent increase in the rate of interest on finance to formulators by commercial banks will nullify the help given by the Government by way of budgetary levies", Mr. Pradeep P. Dave, President of the association said.

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BRINGING MORE DRUGS UNDER PRICE CONTROL

Ministry advised to go slow

Discrete feelers have been sent from the highest levels to the Ministry of Petroleum and Chemicals to go slow in bringing more drugs under price control. The suggestion has been made that no "material changes" should be made in the 1987 drug policy till they are okayed by the Cabinet Committee on Economic Affairs and the Union Cabinet.

It is admitted that it is within the powers of the Ministry of Petroleum and Chemicals to include more drugs under price control. Yet as such a move sends out wrong signals, the Union Government is keen on making doubly sure that the drug industry is not knocked out.

It is becoming apparent that a tougher price regime will guarantee cheaper drugs while affecting supplies. Besides, financial institutions will not be willing partners in funding new projects.

Mr. M.S. Gurupadaswamy in February brought 21 bulk drugs and their formulaations under price control by putting them in category 2 with a maximum allowable post manufacturing expenses (MAPE) of 100 per cent.

The Minister had stated that the list was not exhaustive and he set up a standing committee to review the drug policy. It has not been at all to the liking of the industry, which has been lobbying hard to see the 1987 policy retained.

Drug industry is aware of the move but is not confident as it is not sure of the next move. The standing committee has already had one meeting without coming to any conclusion.

The 1987 drug policy had witnessed intense deliberations and it was refined further by the Dr. Kelkar report on criteria for bringing drugs under the price control. Mr. Gurupadaswamy is none too enthusiastic over the Kelkar committee report which has also suggested more drugs out of price control.

As matters stand, no price applications are being okayed. More, they have all been sent to the Bureau of Industrial Costs and Prices (BICP) with instructions to apply packing norms prevailing years ago and not the new internal norms worked out in 1989.

The drug units have the option to discontinue production of drugs whose prices have become non-viable but are dithering as it could attract further action.

This is the only industry with such a tight mesh of controls giving no freedom to the manufacturers when all other sectors are experiencing a whiff of liberalisation.

DRUG COMPANIES INFORMED OF WITHDRAWAL OF LOAN LICENSING SYSTEM

The drugs controller of India has informed all the state drug controllers, port and zonal offices as well as drug manufacturers' associations about the decision of the Government of India, not to issue new licenses/renewals under the loan licensing system after December 31, 1991.

In December, 1986, a decision was announced to abolish loan licensing in a phased manner before the end of the Seventh Five year Plan as part of the new measures for rationalisation, quality control and growth of drugs and pharmaceutical industry in India.

In pursuance of this decision, the Ministry of Health and Family Welfare had invited objections from drug manfuacturers' associations and individual manufacturers to the proposal to delete the provisions of loan licensing system from the drugs and cosmetics rules. These objectiions and other related issues have been examined in the Ministry of Health and Family Welfare as well as the Ministry of Petroleum and Chemicals.

It has been decided that since there was evidence of abuse of the scheme, in the context of the overall requirement for producing sufficient quantities of quality drugs at reasonable prices, the loan licensing system has to be withdrawn.

ALL ABUZZ

Immunity from the dreaded malarial parasite seems within reach finally offering relief to about 100 million people, who according to World Health Organisation estimates, suffer from malaria at any given time. To date, the malarial parasite has dodged all attempts of vaccination against it. But now an offensive has been declared on several fronts which promises long-term immunity.

First are the attempts being made by Dr. Manuel Patarroyo and his team at the Hospital of San Juan de Dios in Bogota, Columbia. He claims to have had considerable success by coming out with a vaccine consisting of three synthetic peptides.

The vaccine is aimed at attacking at the second stage of the malarial parasite's life cycle, when it emerges from the organs to attack the red blood cells. Two other vaccines also show promise.

The first is being tested by Dr. Geoffrey Targett at the London School of Hygiene and Tropical Medicine and the second is being developed by Dr. John Playfair and his team at Middlesex Hospital, London.

While the former is targeted at the third stage of the parasite's life cycle when it is multiplying in the blood cells, Playfair's team is working on a vaccine which would stimulate antibodies to the malarial toxins in the blood.

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Sterling group to diversify

The Madras-based Sterling Group which revolutionised the personal computer market with its Siva Pc, is diversifying into the fields of basic chemicals and engineering with an investment of Rs. 150 crores.

The group has finalised two major joint sector projects with the state-owned Tamil Nadu Industrial Development Corportion (TIDCO). One is a Rs. 110-crore integrated project for the manufacture of explosive grade ammonium nitrate, concentrated nitric acid, aniline and derivatives. The other project is for producing tungsten metal powder, involving an investment of Rs. 45 crores.

The two projects figure prominently in the list of 17 medium and large scale projects announced by the Tamil Nadu Chief Minister, M. Karunanidhi in the assembly recently. He did not, however, reveal the names of the private promoters. Mr. C. Sivasankaran, Managing director of the Sterling Group and whole-time director of Sterling Computers Ltd., said, that TIDCO has played a major role in arranging technological tie-ups for the two projects. It should be possible to commission the plants within a period of three years, he said.

The integrated project coming up at Ranipet, will have a capacity to produce 40,000 tonnes of ammonium nitrate, 36,000 tonnes of nitric acid, 10,000 tonnes of aniline and 5,000 tonnes of derivatives.

Initially, TIDCO had a plan to manufacture only nitrate and nitric acid to meet the demand of its unit, Tamil Nadu Industrial Explosives Ltd. Subsequently it decided to make it an integrated project for manufacturing petrochemicals utilising the feedstock available with the Manali complex.

Mr. Sivasankaran said than an ammonia terminal with a storage capacity of 10,000 tonnes will also be put up at the Madras port to handle the imported material.

For nitrate and nitric acid, the group has arranged tie-ups with Davy Mckee of West Germany and Norsk Hydro of Norway. It is discussing tie-up with companies in France and West Germany for aniline.

Arrangements are being made with Cochin Refineries for supplying benzene to manufacture aniline and other petrochemicals till such time the aromatic project is commissioned at Manali. There is said to be a tremendous scope for exporting aniline, he pointed out.

Referring to the tungsten metal powder project, which will be implemented by Sterling Tungsten Products Ltd. at Cuddalore, Mr. R. Sivasankaran, director of Sterling Computers, explained that it is 100% import substitution project. The entire demand for powder is now being met through imports from China, Thailand and South Korea, he said. The plant will have a capacity to produce 500 tonnes of tungsten powder out of the imported ore from China.

The company has a technical collaboration agreement with Lucky Goldstar of South Korea, one of the four largest industrial houses in that country and a pioneer in the field. The powder, to be manufactured for the first time in India, will meet the demands of aerospace, aircraft and heavy metal applications. In the second stage, the company will start producing tungsten metal products.

Mr. Sivasankaran in confident of funding the huge investments through internal accruals (Rs. 15 crore current reserves) profits and other incomes. The implementation of the projects will substantially boost the turnover of the group, which is now over Rs. 75 crores.

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Caprolactam shortage hits nylon units

Nylon filament yarn (NFY) and nylon tyre cord (NTC) manufacturers appear to be heading for the worst-ever raw material crisis as the stocks of caprolactam held by the industry have touched lowest levels with no immediate prospects for the import of the material in sight. Some of the spinners are holding stocks of raw material to hardly last till mid-June with no supplies in the pipeline. The delay in finalisation of the procedure for the issue of automatic import licence under the new exim policy has worsened the situation further. Industry sources feel that unless the authorities urgently issue licences for the import of caprolactam some of the units will be forced to down shutters while many more will have to cut down production drastically.

The availability of caprolactam with the nylon industry has come down to 29,456 tonnes as of April 1, 1990 as compared to 34,000 tonnes a year ago and 38,700 tonnes as on April 1, 1988. The lowest-ever stock of caprolactam is considered serious at this juncture when the requirement has gone up substantially during last three years with gradual increase in NFY production and a virtual jump in the production of NTC.

The production of NFY is up from 34,087 tonnes in 1987-88 to 35,758 tonnes during 1988-89 and further to 36,410 tonnes for the last year, while NTC output has increased sharply from 26,566 tonnes in 1987-88 to 35,736 tonnes during the last year. Additionally, Petrofil had produced 306 tonnes of NFY during the last year. Thus, the total production of NFY and NTC has gone up from 60,653 tonnes in 1987-88 to 72,452 tonnes in 1989-90.

The industry had projected a further increase in the production during the current year. However, the authorities are now inclined to only a 10 per cent growth. Thus, on the basis of last year's production of 72,452 tonnes, the industry may be allowed to raise it to around 80,000 tonnes and with new capacity of 5,000 tonnes of NTC by Century Enka and Petrofil's expected production of 5,000 tonnes of NFY, the total production may go up to 90,000 tonnes, excluding that of Gujarat Nylon, requiring about 99,000 tonnes of caprolactam.

GSFC is the lone caprolactam producer in the country at present, which is understood to have promised to supply around 7,000 tonnes to the industry during the current year after meeting the captive requirement and that of Gujarat nylon. FACT is expected to commence production by July 1990 and may supply around 19,000 tonnes by end-March 1991. Thus, after considering the indigenous availability of 26,000 tonnes of caprolactam, there will be a shortfall of 73,000 tonnes to be met through imports even if the lowest level of raw material inventory of around 30,000 tonnes is to be maintained at the end of the current year.

CAPROLACTAM PLANT AT BARAUNI

The proposed 50,000-tonnes caprolactam plant will be set up at Barauni in Bihar, the Petroleum and Chemicals Minister, Mr. M.S. Gurupadaswami, said. The project is yet to be cleared by the Cabinet Committee for Approval (CCA), he said. The finalisation of the site had been delayed as the Bihar Government had been "changing its position" in this regard.

The State Government had, in December 1983, requested that the location of the project be shifted to Sindri keeping in view feedstock and other infrastructural facilities available there. Again in January this year, it asked that the project be shifted to Bokaro from Barauni, Mr. Gurupadaswami said. He said the application for a letter of intent of Bihar State Industrial Development Corporation for setting up an aromatic complex at Barauni was rejected by the Centre for want of feedstock.

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GNFC nitric acid plant on stream

The nitric acid plant in the Rs. 237-crore nitrophosphate complex of Gujarat Narmada Valley Fertilizers Company (GNFC) has been fully commissioned. The 100 mt/d capacity concentrated nitric acid (CNA) plant of GNFC is the largest in the country. With a daily capacity of 630 mt of weak nitric acid (WNA), the plant will prove to be boon to the user-industries and GNFC will be in a position to assure availability of nitric acid to them.

The concentrated nitric acid plant in GNFC has obtained technology from M/s. Plinke who has provided knowhow and did engineering for the same. The weak nitric acid plant employs the latest dual pressure technology having excellent energy conservation features. The proven technology of M/s. Uhde has been used in the weak nitric acid plant.

The commissioning of CNA and WNA plants has geared the project activity for completion of its nitrophosphate complex which includes daily capacity of 475 mts each of ammonium nitrophosphate and calcium ammonium nitrate. With this major diversification, GNFC has entered into the field of manufacturing composed fertilisers. Looking to the fact of the letter of intent for the project received in September 1985, the nitrophosphate complex of GNFC is slated to create yet another record of fast completion of a mega project.

Mr. Gilbert J. Marrou, the engineering expert from International Finance Corporation (IFC) of the US recently visited Gujarat Narmada Valley Fertilizers Company, Bharuch in connection with the nitrophosphate project of the company which is nearing completion and was happy to see that the nitric acid production on stream. IFC, Washington has provided foreign currency loan to GNFC for nitrophosphate complex.

AWARD FOR KAPL

Karnataka Antibiotics and Pharmaceuticals Ltd. (KAPL), Bangalore, has been awarded the Amco shield for the second time in succession for the year 1989-90.

This award was received on behalf of the company by Mr. Amarnath Suvarna, General Manager (HRD) from Capt. S. Prabhala, Chairman-cum-Managing Director of Bharat Electronics at a function held on April 23 by the Rotary Club of Bangalore.

Amco shield award was instituted by Amco Batteries in recognition of positive human resources management and productivity.

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E. Merck (India) does well

E. Merck (India) has fared well during the year ended December 1989. The dividend has been stepped up from 29 per cent to 25 per cent, absorbing Rs. 148.50 lakhs against Rs. 118.80 lakhs.

Sales during the year were higher by 28 per cent over the previous year from Rs. 51.31 crores to Rs. 65.46 crores. The pre-tax profit for the year was 370.69 lakhs compared to Rs. 301.75 lakhs achieved in 1988. The overall profitability, despite the rigid pricing policies of the Government, has thus been satisfactory mainly on account of optimum utilisation of resources and improved efficiency of operations and in particular, due to various diversified activities undertaken by the company and higher exports generated.

During the year, the company has earned a higher gross profit of Rs. 469.77 lakhs against Rs. 385.76 lakhs. After depreciation (Rs. 99.08 lakhs against Rs. 84.01 lakhs), and taxation (Rs. 60 lakhs against Rs. 103 lakhs), the profit after tax amounted to Rs. 310.69 lakhs against Rs. 198.75 lakhs.

After making certain adjustments, the profit available for appropriations amounted to Rs. 423.62 lakhs against Rs. 255.17 lakhs. The appropriations are: proposed dividend (Rs. 148.50 lakhs against Rs. 118.80 lakhs), debenture redemption reserve (Rs. 40 lakhs against nil), gemeral reserve (Rs. 150 lakhs against Rs. 50 lakhs), and balance surplus of Rs. 85.12 lakhs against Rs. 86.37 lakhs has been carried forward.

With various expansions/diversification projects having been completed and others under implementation, the company is well geared to register an appreciable growth, as in the last two years, after Indianisation.

The company has launched the diagnostics project and has set up country-wide network. The medical profession has welcomed this new activity and have extended full support. The company is in the process of launching a 100 per cent export-oriented project. Work on the injectable project in Goa is on schedule and the facilities should be ready for commissioning in the middle of next year.

CHEMCROWN TO EXPAND CAPITAL BASE TO TIE-UP WITH HANSA GmbH

It what could, perhaps rank as one of the few instances of its kind in the Indian corporate world, Chemcrown (India) Ltd., a Calcutta-based company manufacturing leather processing chemicals, is expanding its capital base to accommodate a foreign collaborator.

Chemcrown which has a paid-up capital of Rs. 2 crores will allow Hansa GmbH of West Germany, a leading manufacturer of shoe soles, to take up a 15 per cent stake in the company. This will have the effect of increasing the paid-up capital base to about Rs. 2.37 crores. The authorised capital of the company is Rs. 10 crores.

As of now the bulk of Chemcrown's equity, almost 72 per cent, is with the Bhatia family which has business interests in tea, pharmaceuticals and leather. The group turnover is close to Rs. 35 crores.

Hansa is taking up the equity in Chemcrown as part of the financing arrangement for setting up a 100 per cent export oriented unit in Pondicherry for manufacture of shoe soles and footwear components.

The project cost is approximately Rs. 7 crores. It is to be financed with a promoters contribution of Rs. 2.35 crores, which includes Rs. 37.5 lakhs from Hansa, term loans of Rs. 4.07 crores and internal accruals of Rs. 0.60 crores.

Apart from financially participating in the project, Hansa will also provide technology support and buy-back the entire production of the unit. Hansa will be paid a lump-sum amount of Rs. 37 lakhs as technical fees spread over three equal instalments besides a three per cent royalty on sales.

The complete plant and machinery is also being imported from Germany and involves a foreing exchange outflow of Rs. 4 crores.

The plant will be manufacturing polyurethane (PU) and PU plus rubber unit soles used in sports and gentlemen's shoes. It will also manufacture polypropylene and polystyrene sole components for use in ladies footwear.

TEHRI DAM GETS GREEN SIGNAL

The Government has given the final go-ahead signal for the Rs. 3,000-crore Tehri dam project which is expected to change the face of the Garhwal region of Uttar Pradesh. The five-member committee of experts set up by the Government under the chairmanship of Mr. D.P. Dhoundial, Director-General of the Geological Survey of India, to look into the safety aspects of the dam has come to the clear-cut conclusion that all dangers arising out of seismicity of the project site have been taken note of and that the design of the dam is completely safe. The project has also been cleared by the Defence Ministry.

Teh committee submitted its report about a week ago and the project was finally cleared by the Government on April 23. The Tehri Hydro-Development Corporation (THDC) is confident that the project will be completed by 1996, well ahead of the earlier target date of 2000, provided work is not held up for want of funds.

Bindal Agro Chem declares bonus issue

Bindal Agro Chem Ltd. has declared a bonus issue in the ratio of one share for every two shares held at a board meeting held on April 21, 1990. A 50 per cent dividend was also declared for the year ended December, 1989. This is the third consecutive year that a dividend of 50 per cent has been declared.

During the year, the company's operating income was Rs. 128 crores as against Rs. 106 crores in the previous year, resulting in an increase of over 20 per cent. The export turnover during the year was Rs. 11.06 crores as against Rs. 1.13 crores in the previous year. The profit after interest, depreciation and taxation is Rs. 18.02 crores as against Rs. 12.44 crores in the previous year, resulting in an increase of over 44 per cent. After providing for depreciation of Rs. 3.12 crores (Rs. 0.99 crores), interest of Rs. 1.64 crores (Rs. 3.92 crores), taxation of Rs. 0.28 crores (nil), the net profit for the year is higher by over 72 per cent at Rs. 12.98 crores as against Rs. 7.53 crores in the previous year. The earning per share works out to approximately Rs. 9.

According to a company press release, the low density polyethylene (LDPE) capacity is being increased from 12,000 to 15,000 tonnes per annum by July this year, and finally to 18,000 tonnes. The vanaspati plant at Manideep in Bhopal is operating at full capacity, as are all other units.

The implementation of the gas-based fertiliser plant at Shajahanpur, UP, is progressing well. Approvals for foreign collaboration technical agreements have been received from the government.

According to the press release, critical civil construction work on the project is expected to be over before the monsoon. Vendors for supply of major and long delivery equipments have been identified after global tendering by PDIL.

The share transfer books and register of members will remain closed from 18th May, 1990 to 21 May, 1991 (both days inclusive) for the purpose of payment of dividend. The annual general body meeting of the company will be held on May 21, 1990.

CHEMFAB ALKALIES

The Chemfab Alkalies Limited, a fast growing company in Tamil Nadu has shown impressive results for the year ending March 1990 as compared to the last year.

The total sales of the company incorporated only in 1982 rose from Rs. 10.71 crores in 1989 to Rs. 14.41 crores in 1990 with corresponding PBT going up from Rs. 1.50 crores to Rs. 1.81 crores.

Encouraged by the improved results the company has declared 18 per cent dividend as against 15 per cent last year.

One of the reasons for the improved performance seems to be increased production of caustic soda lye and its uptake by the market. It was up by 2000 MT to reach the level of 4283 MT and sales at 14,369 MT against 2236 MT last year.

In terms of money the sales went up from Rs. 8.53 crores to Rs. 11.56 crores. The company's reserves and surplus have gone up by Rs. 100.75 lakhs — from Rs. 176.11 lakhs to Rs. 276.86 lakhs.

The company was promoted by the Titanium Equipment and Anode Manufacturing Company Limited (TEAM) and it has its plant at Kalapet, Pondicherry a notified backward area with a capacity to manufacture 45 tonnes of caustic soda per day. The equity earning per share which was Rs. 1.59 at March 1988 has now reached Rs. 5.17.

DU PONT OFFERS NITRIC ACID PLANT

Du Pont has offered to set up a nitric acid plant in India and exports its production as part of its efforts to meet the export obligation for the nylon-66 project, proposed to be set up by it in collaboration with Thapars, in India.

Thapars had earlier offered to export a basket of items to meet the nylon-66 project's export obligation and as offset to cost of raw materials to be imported for the plant. This itself was a revised proposal since the earlier proposal from Thapars envisaged only export of a part of the production from the proposed project with Du Pont.

However, the offer of basket of export was rather vague as it did not mean that they would be exporting only the items manufactured from the new project.

The Commerce Ministry had reservations about the proposals and Thapars were asked to specify the items which would be exported.

It is in response to this that Du Pont has now offered to set up a nitric acid plant with a capacity of 100,000 tonnes, production from which can be exported to meet the requirements of other projects being set up in South-East Asia by it.

Originally, Thapars had offered to export items worth about Rs. 300 crores over a 7 to 10 year period. It remains to be seen whether the new proposals would meet the requirement of the exports to offset the imports of the raw material required for the manufacture of nylon-66.

The proposal is now being examined by the government. Certain other problems will also have to be overcome before the proposal can be cleared.

Urea import to hit fertiliser industry

The recent decision of the Government to release about seven lakh tonnes of imported urea from the 'POBL' for the 1990 kharif season is going to deal a severe blow of Rs. 15 to Rs. 17 crores to the fertiliser industry in terms of interest and storage charges.

The release of imported fertilisers is going to be at the expense of the indigenous fertiliser manufacturers whose burden of inventory-carrying cost will increase resulting in severe liquidity problems. As per the pricing norms, the industry is allowed only 21 days credit as inventory-carrying cost for 'N' fertilisers.

The stocks of indigenous fertilisers with the manufacturers have been on the increase since 1985 because of the severe drought during the period 1984-85 to 1987-88. However, despite representations by the industry, the Government continued heavy imports during 1984-86 even though the demand was not up to the expectations. Simultaneously, the industry performed well and the production of 'N' went up from 39.173 lakh tonnes in 1984-85 to 67.124 lakh tonnes in 1988-89 resulting in a capacity utilisation of 85 per cent.

However, due to the resultant glut, the entire indigenous availability could not be covered by the Essential Commodities Act (ECA) allocation. As a result, the stock of 'N' nutrient with the manufacturers which stood at 6.4 lakh tonnes on April 1, 1985 went up to 11.313 lakh tonnes on April 1, 1987 and touched an all-time high of 22.117 lakh tonnes on April 1, 1988, according to official sources.

Thanks to the favourable weather during 1988-89 the consumption picked up and the stocks of 'N' came down to 15.45 lakh tonnes an April 1, 1989. This was also facilitated by the Government decision to restore the status of imported fertilisers as a 'residual supplier' as was the practice until 1985 to be released in the market only when the indigenous supply fell short of demand.

However, the latest move of the Government is with a view to reducing its own inventory carrying cost on the imported fertilisers and transfering the same to the industry. The practice so far had been that in the zonal conferences after assessing the likely demand of the States, and the likely indigenous availability of fertilisers, if there was no shortfall in the indigenous availability, imported fertilisers were not released. In the present case, however, the entire likely production of urea during the season has not been fully covered, not to talk of the opening inventory. As a result, the inventory level of indigenous production will go up again. The industry plea has been that imported fertilisers should be used only as a 'buffer' and preference should be given to the indigenous fertilisers. The industry is also sore that its request for reimbursement of extra inventory carrying cost norm has not been heeded to.

MALLYA IN RACE FOR MCF

Vijay Mallya's entry has upset Rashtriya Chemicals and Fertilisers (RCF)'s plans to take over the ailing Mangalore Chemicals and Fertilisers (MCF). Mallya is trying to thwart RCF bid at a time when the latter was close to clinching the deal, according to highly-placed sources. RCF had proposed a Rs. 115-crore revival package in association with financial institutions. RCF would have chipped in Rs. 45 crores and financial institutions Rs. 70 crores. The plan had been approved by Karnataka Government, which holds 15 per cent of MCF's equity. Financial institutions hold 25 per cent of the equity and State cooperatives 10 per cent.

MCF has an installed capacity to produce 2.17 lakh tonnes of ammonia, 3.40 lakh tonnes of urea, 3,600 tonnes of ammonium bicarbonate and 1.50 lakh tonnes of diammonium phosphate. The company has been perennially facing one problem or the other from its inception and its total accumulated losses are in the region of Rs. 10 crores. The company was incorporated in 1966 as a private limited company called Malabar Chemicals & Fertilisers Pvt. Ltd. It became a public limited company the next year. It changed its name to Mangalore Chemicals & Fertilisers in 1971. Dugal Enterprises Pvt. Ltd., the then Government of Mysore and International Development & Investment Co. Ltd., (IDIC) acted as the promoters of and initial investors in the company till 1968.

Subsequently, IDIC expressed its desire not to participate further in the capital of the company, but retained possession of 2.5 lakh equity shares of Rs. 10 each, fully paid up of the company subscribed for by it initially. Thereafter, Mysore State Industrial Development Corporation, Mysore State Co-operative Marketing Federation Ltd. and Mysore State Agro-Industries Corporation Ltd. joined as co-promoters. Rallis India also subscribed for Rs. 40 lakhs in the equity capital of the company. MCF has its plants at a 80.94-hectare site at Panambur, a village adjacent to the new all-weather port, about 9 km. north of Mangalore city. The Gurpur river runs on the east of the site and the West Coast Highway (connecting Cochin and Bombay) on the west.

CEI HAILS TN TAX HOLIDAY SCHEME

The Confederation of Engineering Industry has welcomed the incentives offered by the Tamil Nadu Government to industrialists promoting new ventures in the State. The sales tax holiday extended to new industries as well as to those who are expanding will go a long way in generating more employment opportunities, creating export potential and promoting the growth of ancillary units according to Mr. E.K. Parthasarathy, Chairman of the Tamil Nadu committee of CEI.

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Record output by IOC refineries

Indian Oil's six refineries at Guwahati, Barauni, Gujarat, Haldia, Mathura and Digboi processed a record quantity of 23.5 million metric tonnes of crude oil in 1989-90 achieving over 100 per cent of the OEB (Oil Economy Budget) target for the sixth successive year, according to a press release.

IOC refineries also exceeded the crude throughput, total distillates yield and LPG bottling targets specified in the Memorandum of Understanding that was signed between Indian Oil Corporation and Government of India last year.

The total quantity of crude oil processed by IOC refineries during 1989-90 was 7 per cent higher than the previous record of 22 million metric tonnes attained in 1988-89. This was made possible by optimising crude processing capacities and increasing the number of onstream days. Notable among the IOC refineries were those at Gujarat, Haldia and Mathura that attained highest ever crude oil processing.

For maximising production of the valuable middle distillates like kerosene and diesel oil, the secondary processing facilities of the refineries also yielded all-time-high results in 1989-90. The Fluid Catalytic Cracking Units (FCCU) at Gujarat and Mathura achieved the highest ever throughputs exceeding the design capacities for the fifth successive year.

The production of high-value Lubricating Oil Base stocks at Haldia Refinery attained an all time high record of 151 thousand metric tonnes. Guwahati Refinery's Coker Unit, achieved a record throughput of 341 thousand tonnes during the period under review.

Significant increase was achieved in the production of various petroleum products especially LPG, motor spirit

diesel oil and bitumen. Around 5 lakh tonnes of liquefied petroleum gas was produced during the year 1989-90 registering an increase of about 17 per cent over last year. The refineries also recorded highest ever production of LPG individually.

There was a record production of 16.6 lakh tonnes of motor spirit (petrol) meaning an increase of 9 per cent over the last year. Gujarat, Mathura, Barauni, Haldia and Digboi refineries set highest ever production records of motor spirit individually. Kerosene, aviation turbine fuel and diesel oil recorded substantial increases in production over 1988-90 i.e. 5.2 per cent, 2.5 per cent and 7.7 per cent respectively and were also the highest ever.

An all-time-high record was established in the production of bitumen in 1989-90. By producing 830 thousand tonnes of bitumen, the Corporation registered an increase of 6.4% over last year, with new individual production levels achieved by Gujarat and Mathura refineries.

Indian Oil's 3850 km vast network of pipelines also displayed impressive performance during the year 1989-90. The pipelines network despatched 20.880 MMT of crude oil and petroleum products surpassing the previous high of 20.285 MMT in 1988-90.

The achievements in the field of production were ably supported by safety performance. Haldia Refinery achieved an all-time-high record of 5.50 million man-hours accident free operation. Likewise Mathura Refinery attained 4 million man-hours accident free operation during the period under review.

The refineries continued to maintain strict controls during the year to meet the norms prescribed by the State Pollution Control Boards with regards to liquid and gaseous effluent from the

HPCL PLANNING NEW PROJECTS

Hindustan Petroleum Corporation Ltd. (HPCL) hopes to implement projects costing more than Rs. 3,000 crores during the Eighth Plan.

These include a new six million tonne grassroots refinery on the western coast, Visakhapatnam-Vijayawada product pipeline, paraffin plant at Vizag refinery and LPG import facilities at Mangalore. A detailed project report for the Mangalore project has been submitted to the Government.

The 168 km-long Bombay-Pune pipeline handled more than two million tonnes of products recording over 100 per cent capacity utilisation according to an HPCL press release.

A 30 mw captive power plant was commissioned at the Bombay refinery at a cost of Rs. 72.12 crores and three LPG bottling plants were opened at Gandhinagar, Hoshiarpur and Unnao, each with a capacity of 5000 tonnes a year.

On the environment front, a sulphur recovery unit has been proposed at the Vizag refinery. A waste heat optimisation and VPS furnace revamp facility at Bombay refinery are under implementation.

Bombay refinery recorded the highest throughput of 5.75 million tonnes which includes the highest-ever imported and Bombay High crude throughputs. The new unit of Bombay refinery processed 2.24 million tonnes of crude clocking a capacity utilisation of 112 per cent, it has been claimed.

Sales totalled 10.32 million tonnes during the year. The corporation commissioned 78 new retail outlets, 10 new kerosene/LDO dealerships and 32 new liquefied petroleum gas

Kandla-Bhatinda pipeline cleared

The 15-month long inter-ministerial battle over the Kandla-Bhatinda pipeline seems to have ended. The Finance Ministry has cleared the project after considering all views against and in favour of the project.

The proposal has now been referred to the Union cabinet for its final seal of approval. Offical sources see the clearance of the project by the Finance Ministry as an indication that the government does not want to waste any more time in a protracted inter-ministerial war. It is keen that it gets implemented without much delay and consequent cost escalation.

The 1,330 km long petroleum products pipeline is to be implemented by the Indian Oil Corporation (IOC). The World Bank has already sanctioned $350 million as loan for the project, whose total implementation cost is estimated at over Rs. 650 crores.

The Public Investment Board (PIB) had recommended the project for clearance in January 1989. Even before the Finance Minister could approve it and send it to the cabinet, as per procedures, it was opposed by the Railways and the Planning Commission. On the other hand, the Petroleum Ministry countered that the pipeline was vital to a more reliable and easy petroleum products transportation network in the northern region.

Curiously enough, the planning commission had earlier recommended the project for consideration by PIB. Moreover, PIB being an inter-ministerial body, the views of all ministries concerned were considered and then the project was cleared.

But after PIB had cleared the project, the then Railway Minister, Mr. Madhavrao Scindia, opposed the project on the ground that a railway line on that route could adequately meet the requirement of carrying the petroleum products in this segment.

The then Planning Minister, Mr. Madhavsinh Solanki also opposed the project and in a pre-emptive bid got the planning commission hurriedly clear the Kandla-Bhatinda railway line project.

Hectic lobbying and counter-lobbying followed. The Petroleum Ministry argued that the delay in clearing the pipeline project had threatened to disrupt plans to meet the large demand for petroleum products in the fast-growing north-west region.

It also argued that the econonic cost of transportation by rail was 2.5 times more than that of the proposed pipeline. Apart from the investment on laying the track, the value of capital and operating cost for rail transportation was estimated at Rs. 1,365 crores, compared to Rs. 650 crores for the pipeline.

The Planning Minister even sought the intervention of the Prime Minister in this matter. Subsequently, the then Finance Minister, Mr. S.B. Chavan, was asked to convene a joint meeting of the ministries concerned.

But before the meeting could be convened to thrash out the issues, the general elections were announced.

After the National Front formed its government at the Centre, the controversy did not end. But the planning commission deputy chairman, Mr. R.K. Hegde took a stand that there was no need for any debate at the ministerial level over the pipeline project. He argued that since it was cleared by PIB, the normal course was to send it to the Cabinet.

Mr. Hegde's stand put a sudden end to the controversy. The Finance Minister, Prof. Madhu Dandavate, also concurred with the planning commission deputy chairman's view, official sources say that in all probability the project would not face any major hurdle at the cabinet level, since it has now got the backing of the new government.

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Record crude processing at Haldia refinery

The Haldia refinery of Indian Oil Corporation processed a record 2.82 million tonnes of crude, achieving 107.6 per cent capacity utilisation during 1989-90. In 1988-89, the refinery operated at 103 per cent capacity.

The achievement is considered significant because the refinery has remained closed since March 12 as part of the statutory shut-down operations, undertaken after every 18 months. In other words, there was no production during the closing weeks of the last financial year.

However, despatches during the period were normal. The production of high value lubricating oil base stocks attained an all time high of 151,423 tonnes.

The total record despatches by the refinery were: by road 594,373 tonnes, 697,708 tonnes by rail and 269,239 tonnes by barge. Bulk despatches of LPG were 21,393 tonnes and of bitumen 130,645 tonnes. Also, as many as 37,787 wagons and 38,375 trucks were loaded.

PETROFILS CO-OP: Rs. 213 CRORES SALES DURING '89-90

Petrofils Co-operative Ltd., a joint venture of the central government and co-operatives at Baroda, has achieved a sales turnover of Rs. 213 crores in 1989-90 — an increase of 36 per cent over the previous year. A company statement received at Baroda said with a sales turnover of Rs. 157 crores in the previous year, the profit was about Rs. 15.6 crores. This year, the estimated profit was Rs. 18.1 crores.

Yarn production during 1989-90 was 13,855 metric tonnes (MT) as compared to 10,258 MT during the previous year, an increase of 35 per cent. Capacity utilisation was 150 per cent at the Baroda unit and 130 per cent in the unit at Valia in South Gujarat's Bharuch district. During the year, the society set up its second plant of nylon-6 yarn with an investment of Rs. 120 crores at Valia in Bharuch district, the statement said.

The company has also introduced an employment scheme in this backward area under which local tribal unskilled youth would be made skilled craftsmen in a period of three years through training. In Tamil Nadu, Petrofils embarked on production of high fashion sarees in the handloom sector this year, the release said.

In Uttar Pradesh, Petrofils introduced more than 12,000 weavers to weaving nylon and polyester sarees with Banarasi brocade designs, which were subsequently well received in lower and middle income groups throughout the country.

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Together We Progress

Krishna, Godavari basin yields yet another oil well

Oil and gas have been struck at the first well on the Mori structure in Krishna-Godavari onland in Andhra Pradesh. The well drilled to a depth of 3,205 metres has an yield of 595 barrels a day and 92,081 cubic metres of gas an Oil and Natural Gas Commission press release said.

The structure, which covers an area of 7.5 km, was likely to add about three million tonnes of oil and oil equivalent gas, it said. The release said the discovery of oil in the Krishna Godavari onland has added a new dimension to the oil prospects in the region. Oil was struck for the first time in 1986 at Kaikalur in the Krishna district. The cumulative production so far from this basin has been about 86,000 barrels.

The Krishna-Godavari basin, encompassing an area of about 20,000 sq. km. onland and 21,000 sq. km. up to 200 m isobath in the offshore with prognosticated resources of 890 million tonnes (405 mmt onland and 485 mmt offshore), was emerging as a potential oil and gas producing area in the country, the release said.

The release said a total number of 10 rigs had been deployed in Krishna-Godavari (eight onland, two offshore). Drilling was being carried onland at Mandapetta, Amlapuram, Chintanapalli, Elamachilli, Bantumilli, Tatipaka, Manapalli and at Ravva in offshore. Out of the 103 wells drilled in Krishna-Godavari 37 had proved to be oil and gas bearing.

It said there were quite a few areas in the basin which were prospective and yet to be explored. During the Eighth Five Year Plan, the major thrust areas for exploration would be 1. Avanigadda, 2. areas around Bantumilli, 3. Gudivada, 4. Tanuku-Bhimavaram sector, 5. Ramachandrapuram Mandapetta area, 6. extension and flanks of Kaza-Kaikalur areas.

Geoscientific surveys would be carried out in the Repalle and Krishna basins. The prospective areas in offshore are Vishakapatnam bay and Masulipatnam bay.

PLASTIC CLEANS UP OIL SPILLS

Nippon Shokubai Kagaku Kogyo of Japan has developed a plastic that can absorb up to ten times its weight in petroleum.

Nippon Shokubai, known mainly for its water-absorbent resins used in disposable diapers, said the main material of the new plastic is acrylic monomers. Compounds of these monomers are designed to absorb petroleum and other oils into their molecular structure.

Once the oil is absorbed, it will not leak out when pressure is applied because the oil is trapped within the molecular structure of the polymer.

These plastics can also be used to absorb benzene, vegetable oils and halogen-based solvents. The plastic can absorb up to 25 times its weight in solvents and ten times its weight in petroleum.

This new plastic has been designed to absorb only the oil when oil is found mixed with water. One way to clean up oil spills will be to place the plastic in bags made of nonwoven cloth and lowering it into oil spills. The plastic will absorb the oil that seeps into the bag and the bag can then be removed.

NEW RECORD IN CRUDE PROCESSING BY INDIAN OIL

Indian Oil's refinery at Mathura has achieved a new record, processing 7.205 mmt of crude during 1989-90 as against the previous best of 6.557 mmt during 1988-89. The refinery, commissioned in 1982, was designed to process 6.00 mmt of crude annually.

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WITH DETAILED PROPOSAL

TRANSBOUNDARY MOVEMENT OF HAZARDOUS WASTES

PM seeks new code of ethics

Prime Minister Mr. V.P. Singh asked developed countries "to seize the opportunity of changing global polity and ensure the phased elimination of nuclear weapons and other weapons of mass destruction and lay the foundations of durable peace". The greatest threat to the environment, perhaps, arises from nuclear weapons and other weapons of mass destruction and their use. Either by intent or miscalculation, they could cause an environmental catastrophe destroying life as we know it on the planet, he said.

Mr. Singh's speech was read in a conference of select developing countries on global environmental issues at New Delhi on April 23, by the Railway Minister Mr. George Fernandes. Delegates from over 20 developing countries are attending the conference that is expected to discuss global warming, ozone depletion and problems of transboundary movement of hazardous wastes.

Mr. Singh said "barriers and curtains" which separated people and countries were being dismantled with astonishing speed. "Old antagonisms and animosities are gradually eroding", he said. "The opportunity needs to be seized and phased elimination of nuclear weapons of mass destruction should be ensured to lay foundations of durable peace". The Prime Minister asked the participants to address themselves to the movement of hazardous wastes across the international boundaries.

"A new code of ethics on such transfers is overdue and it is in the interest of the developing countries to see that they are not at the receiving end of such hazards", he said. "We have to enhance our capabilities to identify the hazardous wastes coming into our countries and to ensure that no such waste is dumped on us", he said.

The environmental crisis that we face is very grave and demands a genuine cooperative effort by the world community, Mr. Singh said. For such cooperation to be effective, "we must take into account the concerns of both the industrialised and developing nations. We must all work together to preserve the global environment. Our very survival is at stake", he said.

India, he said, was participating actively in the inter-governmental panel on climate change. "We need a serious scientific effort to study and analyse the problem in all its complexities and arrive at effective and equitable solutions".

Referring to the Montreal Protocol which seeks to reduce the excessive use of chlorofluorocarbons (CFCs) which depletes the ozone layer, Mr. Singh said developing countries should certainly participate in any effort which protects and sustains the health of this planet. But such efforts must be pursued with a sense of equity and fairness. The industrialised countries, who are responsible for the high concentration levels of ozone depleting substances, must develop mechanisms for transfer of technology on a preferential and non-commercial basis and set aside additional resources to enable developing countries to shift to environmentally safe technologies.

Mr. Singh said he understood that negotiations to achieve this were continuing and hoped it would lead to the Montreal Protocol being amended in a manner that would also meet the interests of the developing countries. The Prime Minister said developed countries took positions from their own point of view in determining the direction and scope of international negotiations on environmental issues.

He hoped the conference would help initiate a dialogue that could develop a framework for cooperation among developing nations on transfer of technology, sharing the results of research and development and exchanging information on global environmental problems. The Minister for Environment, Mrs. Maneka Gandhi, said an inequitous international economic order had put enormous pressure on the natural resources and environment of all the developing countries.

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Experts vouch for safety in Tehri dam

During a visit to the Tehri dam project site in the third week of April, Mr. S.P. Singh, chairman of the Tehri Hydro-Development Corporation (THDC), told a group of presspersons that the expert committee had made a detailed assessment of the Himalayan geotectonic features around Tehri and had come to the conclusion that even after keeping in mind the worst possible scenario of an earth-quake of the magnitude of eight points on the Richter scale with the epicentre within 15 kilometres of the dam site, the special design of the dam would keep it totally safe.

The expert committee has noted that the dame slopes are stable, with adequate factor of safety, and that there was no danger of slumping down of the dam materials. A liberal freeboard had been provided above the level of the reservoir, to prevent any overtopping of reservoir water during an earthquake.

The Government has given the highest credibility to the expert committee as besides the chairman, it has top experts in the field as members. Mr. D. Guptasarma is the Director of the National Geophysical Research Institute, Mr. C.D. Thatte is the Member, Design and Research of the Central Water Commission, Prof. L.S. Srivastava is the head of the Earthquake Engineering Department of the University of Roorkee and Dr. Harsh Gupta is the Vice-Chancellor of Kochi University.

The committee also examined the possibility of reservoir induced seismicity and came to the conclusion that since the dam was completely safe, no additional considerations were necessary.

The committee was set up about a month ago after the Environmental Appraisal Committee had rejected the project proposal. The base of the dam will be 1100 metres wide while, at the top, it will taper off to a width of 20 metres. The dam slopes are not very steep, making the dam very stable, and the authorities have decided on an earth and rock-fill structure which is to be compacted very densely. The structure will be self-sealing, even in the event of minor cracks, Mr. Singh said.

In the Himalayan region, only 17 per cent of the hydro potential has been exploited. If the hydro resources of the country were not harnessed and managed properly, in about 50 years, there will be no drinking water for the people, he said.

"The underground water table is falling and we need to save every drop of water. To allow water to flow away unused is to allow the flowing away of gold", he emphasised. He added that it was essential to have a proper mix of thermal and hydro power to meet the peak hour demand of electricity.

Crop potential

In his view, the Tehri project would do for the poor and undeveloped Garhwal region what the Bhakra project had done for Punjab and Haryana. The multi-purpose Tehri project is expected to provide drinking water to the villages and the new Tehri township as well as to give some water to Delhi. Intensive irrigation of 2.7 lakh hectares is expected to double the produce in the region and make possible the introduction of crops like rice which need more water.

A visit to the project site showed that the area which will be submerged by the reservoir is in fact devoid of forests — the hills are covered with only shrubs and grass as the forests were cut down in this area long before the project work was started. In fact, the afforestation work which is to be undertaken by the THDC is expected to green the hills, while the moisture provided by the reservoir will make speedy afforestation possible.

Soviet expert's view

Mr. V.A. Davydov, chief Soviet expert, who has been supervising the

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project at the site for the last two years, said that the seismic zone of the Nurek dam in the Soviet Union, which is 300 metres high compared to the 260 metres high Tehri dam, was more active. Responsible for building the Nurek dam and the Rogun dam upstream, he said that in the last 12 years, the Nurek dam had withstood 'very well' the two or three earthquakes of 5 to 6 points intensity experienced in that area each year.

The conditions of the Tehri dam were very similar, he told reporters, and added that a physical inspection of the Bhagirathi river bed at the dam site, after the diversification of the river in November last year, had shown that the rock had no faults whatsoever, contrary to what had been said by some people. The cavity on the left bank of the river bed was a 'normal feature', he added.

The Tehri dam, contrary to propaganda by some environmentalists, would have a life span of at least 100 years and could be stretched to 163 years at a sedimentation rate which has been taken to be higher than the actual rate recorded over the last several years. The entire dam design is Indian, with the Soviet experts approving it. While the team of Soviet experts will be supervising the construction as consultants, they have been given a turnkey contract for two power houses, for the transmission system and for the smaller Koteshwar dam.

When the Tehri dam project was first conceived, it was to have generated 600 MW power and since then, the capacity has been increased to 2400 MW peak capacity. The site chosen is also the only possible for a dam on the Bagirathi.

Concern about rehabilitation

Talking to people in the old Tehri town, which will be submerged by the reservoir, it appears that while the people are not against the building of the dam — most of them seem to be aware that the project could bring prosperity to the Garhwal hills — there is the fear that they will not be given adequate and timely compensation to enable them to settle down to a new life. It is clear that so far the record of the Uttar Pradesh Government on rehabilitation work has not inspired confidence. People given compensatory agricultural land over eight years ago in Bhaniawala between Rishikesh and Dehra Dun, for example, have not yet been registered as owners of the land. Full settlements are yet to be made and people complained that tiresome trips to Government offices in Tehri have produced no results.

The THDC also admits that the rehabilitation work has not progressed well, but points out that this has been handed over to the Corporation only in February this year. "We have elaborate plans for developing fisheries, for breeding high milk-yielding cattle, for developing hydroponics and plans for introducing fruit trees in the region", said Mr. B. Chakravarty, Additional General Manager for Rehabilitation. This year, the THDC hopes to get Rs. 100 crores for rehabilitation which would be spent mostly on shifting the entire population of the old Tehri town to new Tehri and to some other places.

While the fears of the people who have been settled there for several generations are understandable, the THDC hopes to generate confidence by making Tehri rehabilitation a model for other river valley projects. Anyhow, with a clearcut decision by the Government, the project is expected to go ahead full stream.

PERSONALITIES

Mr. Gurdeep Singh has been appointed Vice President, Technical, Hindustan Lever Ltd. **Mr. Balwant Singh** has been appointed the Managing Director of the Gujarat Mineral Development Corporation.

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Hydrocarbons replace CFCs as aerosol propellants

Thomas Midgley Jr was born in Pennsylvania in 1889. His father and grandfather were both inventors and Midgley himself showed an early streak of inventiveness. At his school age, he introduced an elm bark extract as a lubricant. He graduated in mechanical engineering from Cornell University in 1916. When he was working for Delco Engineering Laboratory he discovered the use of tetraethyl lead to improve petrol performance and the use of chlorofluorocarbons as refrigerants.

The leaded gas or petrol became a huge success and contributed to the mass growth of automobile transportation in the U.S. and this also led to environmental problems most inconceivable at that time. From knock in automobile engines Midgley turned his attention to the refrigeration industry. At that time the refrigerants used were unpleasant substances — notably ammonia. Leaks from fridges had harmed people. New refrigerants were needed for modern air conditioners. He looked at the periodic table and concluded that fluorine containing gases would provide the answer. He prepared a number of fluorine containing compounds. His samples killed animals, confirming that CFC — chlorofluorocarbons — would be toxic. The earlier samples he prepared were contaminated with antimony fluoride. However his later samples were successful. He demonstrated at a public meeting and breathed in a lungful of the CFC and exhaled it gently and the public realised that the chemical was not dangerous. Midgley failed to see at that time that CFC had potential use as an aerosol propellant in the seventies.

The origins of the ozone/CFC problem came shortly before Midgley's death in 1944 on a very small scale. This invention of his, like leaded petrol, created problems in the Eighties by destroying the ozone layer. In the Forties, he contracted polio and was partly paralysed as a result. He devised a pulley system to help him to get out of bed. In November 1944, he became entangled in this and strangled himself to death.

The CFC industry has been the subject of a great deal of adverse publicity during the last few years from high level politicians, the public media and conservationists who all condemned CFC and aerosol products. Western world production now exceeds 8000 million filling a year. CFCs have deleterious effects on the stratosphere by creating 'holes' in the ozone layer.

People living in both cities and rural areas are now spending more on cosmetics, hygiene products, foods, health care products, perfumes etc. packed in aerosol cans. The growth in this area is the biggest in the world. Aerosols are a combinatin of chemistry and physics that provides a convenient means of preserving and dispensing liquids and powders. An aerosol package esentially consists of four components — the container, the valve, the spray gun or nozzle, and the product liquid or powder.

The containers are pressure vessels able to withstand a particular pressure — a typical aerosol operates at two to three atmospheres. These containers are made of tin plate, aluminium or glass. A valve seals the outlet of the container — this is a mass produced item. The valve produces the correct flow. The button which operates the valve houses the spray nozzle. The nozzle generates the spray pattern — narrow angle, wide angle, short throw, long throw or a fine jet.

The product — a liquid or powder —is the basis of the aerosol. This is a chemical mixture for example in a perfume cologne spray, of perfume + solvent and a liquid propellant gas, CFCs are included in the formulation. CFCs have become unpopular because of their side effects and are being replaced by new ozone friendly propellant gases — hydrocarbons.

Hydrocarbon blends are the recent introduction to aerosol technology. However, unlike CFCs, these hydrocarbons are hazardous. The hydrocarbon propellants exist in the gas phase under normal room conditions, but it is in the liquid phase at elevated pressures, these propellant gases are used as aerosol propellants.

The propellant gas is important from the scientific point of view. During the manufacture of an aerosol can, a chemical formulation, say a boot polish spray which consists of carbon black/wax/oil/water etc. is fed into a container until it is 70 per cent filled. The container is then sealed. A vacuum is drawn and the propellant in the form of liquid gas is inserted into the can via the valve. The liquid gas propellant evaporates and fills over the rest of the 30 per cent of the container and this results in two - three atmosphere pressure, depending on the specification of the hydrocarbon gas used as liquid propellant. As the product concentration falls, more volume results and more liquid gas propellant evaporates and maintains the pressure and keeps the force acting on the liquid content.

The new technology to save the ozone layer is to use compressed gas hydrocarbons as propellants instead of the CFC liquid gas. This is a formidable challenge. A compressed gas pushes the product out of the valve when it is opened, but as the aerosol empties the gas pressure continuously decreases. This problem of reduction of pressure inside the aerosol is circumvented by the use of new designs of valves containing springs and diaphragms which decrease or increase the nozzle opening and maintaining constant 2 to 3 atmospheres pressure inside the can. Thus liquid gas propellants are likely to be eliminated completely in the near future by using compressed air technology. Aerosols have found use in all walks of life from foaming table cream to perfume sprays and would be sadly missed if Government regulations are brought in, in various countries, to protect the ozone layer and environment.

SM Dyechem to set up carbon black unit

Karnataka State Industrial Investment & Development Corporation Ltd. (KSIIDC) has selected city-based SM Dyechem Ltd. as a joint sector partner to implement a Rs. 45-crore carbon black project in Mangalore.

KSIIDC will hold a maximum of 11 per cent equity and the private sector partner will contribute 25 per cent. The balance equity will be offered to public and financial institutions. KSIIDC has an SIA registration for the project, which is to come up in Bala village, Mangalore, Dakshin Kannada district.

SM Dyechem has started scouting for technology for the project. The company is required to finalise technology and draft articles of association for setting up a new company within three months.

The industry has an installed capacity in excess of two lakh tonnes but production has not been able to match this capacity primarily because of shortage of feedstock, much of which is imported. The Mangalore project may also have to depend on imported feedstock until such time the Mangalore refinery begins production.

The industry is dominated by Goenkas who control three companies: Phillips Carbon, Oriental Carbon and Gujarat Carbon, each with capacities of approximately 40,000 tonnes. The other units are United Carbon (36,000 tonnes), Ralson, Carbon & Chemicals (20,000 tonnes each), Eureka Chemicals (6,000 tonnes) and Hitech Carbon (25,000 tonnes). The total production during 1988-89 is estimated at around 1.2 lakh tonnes. Dynamatics Hydraulics Ltd.'s carbon black export-oriented unit is under implementation in Tarapur, Maharashtra. There are two unimplemented letters of intent: Uttar Pradesh Carbon & Chemicals Ltd. and one Shantibhai Desai in Maharashtra.

The Government has liberalised licensing for this industry and fixed the minimum economic size at 40,000 tonnes. Existing units have been allowed to automatically raise their capacities to this size. Some of these units have accordingly expanded their capacities, thereby raising the installed capacity lot more than warranted by demand. Fortunately, production has not kept pace, thanks to shortage of carbon black feedstock, a refinery product.

Tyre companies import about 10,000 tonnes of carbon black a year, especially high-grade carbon black.

NEW METHOD FOR COAL RETRIEVAL

The Central Fuel Research Institute (CFRI) scientists have developed a technique to retrieve clean coal from middlings. The scientists claimed that by applying the oil agglomeration technique, nearly 2.5 million tonnes of clean coal could be retrieved from nearly five million tonnes of middlings produced annually in the country's washeries.

Scientists P.N. Dash and R. Haque claimed in a paper submitted at a workshop at Ranchi that they successfully developed the process at a two-tonne-per-hour pilot sclae plant at the Lodhna washery of the Bharat Coking Coal Limited. The pilot plant result showed that 55 per cent of the prime coking coal used in coking blend could be replaced by process middlings called agglomerates without affecting the coke strength.

The process could also be suitably applied for upgrading lower seam coal of the Jharia coalfields as metallurgical coal. The coal is presently being used as power coal.

Coal obtained from the middlings through the oil agglomeration process was found to contain ash as low as 18 per cent.

In the first phase of the oil agglomeration process, washery middlings are grinded to a fine size. The material is then conditioned with light hydrocarbon oil in a high-speed sealed conditioner. The conditioned pulp is agglomerated in a cell using a viscous bridging oil and again separated from water-laden minerals by screening. The agglomerated materials have easy dewatering characteristics.

The process, however, is expensive due to the high grinding cost of raw coal and bridging oil. The capital cost for installation might be curtailed by incorporating the oil agglomeration unit in the conventional washery, the paper said.

IDI OPENS OFFICE IN VIETNAM

Indian Dyestuff Industries Ltd. (IDI) has opened an office in Ho Chi Minh city, Vietnam.

This will be the fourth trading office of the company in south-east Asia, the others being in Singapore, Bangkok and Hong Kong. IDI also has promoted a joint venture dyes manufacturing unit in Thailand called Matangi Dyestuff Industries. The company is considering setting up of more trading outposts as part of its export promotion efforts. IDI Executive Director Mr. Atulya Mafatlal said.

Sunbelt Corporation, the group's joint venture in United States set up in 1987 is doing exceedingly well, Mr. Mafatlal said. This is the only unit manufacturing basic crude vat dyes in United States. Despite an increasing demand for vat dyes from textile industry, the global supply position is deteriorating.

IDI has tied up with Montedison of Italy to set up a 100 per cent export-oriented unit to produce copper phthalocyanine crude, a dye intermediate. The project is to come up at IDI's existing site at Ranoli near Baroda.

GLOBAL ENVIRONMENT

Montreal protocol amendment likely

Mrs. Maneka Gandhi, Minister of tate for Environment and Forests, said he Montreal protocol is going to be mended in June this year in London to uit the needs of the developing countries.

The Minister was speaking at the nternational conference of select develping countries on global environmental ssues at New Delhi.

She said if the developing countries re not given the opportunity to discuss he best course of action to deal with lobal environmental problems and uggest solutions suitable to their needs, here is a danger that developed countries would go ahead and enter into conentions and protocols which do not lly take into account their concern.

Suggesting the need for technology ransfer to developing countries from he developed countries, she said that in he last 40 years technologies had been made available to the developing countries only at a great price.

Sometimes even those had been enied if the patent holders felt that they an make greater profits by monopolising the supplies throughout the world.

The conference will enable the develping countries to devise their stand to e taken at the international fora on the ssue of technology transfer, the Minister said.

About the problems being faced by he developing countries due to their normous debt burdens, she said the most poor countries had to over-exploit heir natural environment in order to arn enough to repay the loans.

These fundamental issues with large mpact on environment have not so far een tackled by the international community, she added.

She hoped that the combined wisdom of the participating countries would help in evolving strategies to be adopted by the developing countries regarding these issues in the forthcoming 1992 Brazil conference.

Speaking on the occasion Mr. Mahesh Prasad, the secretary, Ministry of Environment and Forests said that the purpose of this conference was not to distinguish the developing countries from the developed ones.

Global environmental issues affect every country and hence the solutions to these could be successfully implemented only with the participation of all countries.

Mr. Prasad said a conference of this type would enable developing countries to increase the understanding of their perceptions throughout the world. The problems faced by the developing countries have more immediate implications than some of the global environment issues they are asked to discuss and negotiate in international fora, he added.

PLEA AGAINST ST HIKE IN TN ON PLASTIC ITEMS

The Tamil Nadu Plastics Manufacturers' Association, in a memorandum to the Tamil Nadu Chief Minister, has pleaded for a cut in the enhanced sales tax structure announced by Mr. M. Karunanidhi, in the state budget.

The Tamil Nadu government has shifted the multi point taxation to single point taxation on all goods other than those covered by first and second schedule from April 1 this year. Due to this, the rate of tax for plastic granules has increased to eight percent.

With this increase all plastic articles which were attracting five per cent multi point will also hereafter attract tax at eight per cent single point.

While welcoming the tax reduction for polythene sacks to two per cent single point, the association pleaded for a cut in the rate of tax on plastic granules.

The association has pointed out that in the last two years the cost of plastic raw materials had increased by 80 per cent. The tax paid by them for the same material in April 1989 was only Rs. 1.20 per kg while the present rate was Rs. 12.55 per kg. Similarly, on all plastic articles, the tax per kg had risen from Rs. 12 approximately to Rs. 13.65.

The association claimed that such a steep increase in tax would result in escalation of price and sales tax. It would also lead to the closure of small units.

PLASTIC UNITS FOR INCREASE IN DUTY EXEMPTION LIMIT

The All-India Federation of Plastic Industries (AIFPI) has demanded an increase in excise duty exemption limit to Rs. 50 lakhs for units manufacturing two items, in view of the high cost of raw materials and other inputs.

In a post-Budget memorandum to the Finance Minister, the federation sought a conducive fiscal environment suitable for the growth of the small units in the country.

In a press release issued at New Delhi, the president of AIFPI, Mr. M.R. Gupta said the Finance Minister has assured that the federation's recommendations would be considered sympathetically.

Mr. Gupta pointed out that the Minister was also appraised of the discriminatory treatment meted to the PVC cloth manufacturers in the small sector vis-a-vis large units both in the duty structure on raw materials and end product

PVT SECTOR POWER PLANTS

MRTP exemption likely

The government is considering a proposal to exempt the private sector from obtaining MRTP clearances for setting up power plants in the country.

At present, clearance from MRTP is required for private licencees involving an intial capital outlay exceeding Rs. 100 crores for setting up power plants or to take up expansions exceeding 25 per cent of the originally approved capacity.

It is also considering certain modifications in the special appropriations allowed by state governments to meet the debt redemption obligations of the private licencees.

It is proposed that the extent to which special appropriations are allowed, the licencee would allot equity in favour of the state government or the state electricity board and the transfer will take place on the actual expiry or revocation of the licence on a pre-determined basis.

A bigger role for the private sector is now being envisaged by the government in setting up additional capacity to meet the power requirements in the Eighth Plan. Fresh proposals in this regard are being put up to the Cabinet.

It may be mentioned that following a meeting with top industrialists in June last year, the government had hammered out a package with several concessions for the private sector to encourage it to invest in the power sector.

Against a debt equity ratio of 1:1 applicable to the Central public sector undertakings, it was proposed for the private sector the debt equity ratio should not exceed 4:1 subject to the condition that the mobilisation of funds from sources other than public financial institutions shall not be less than 60 per cent. A minimum of 20 per cent should be the equity component out of which at least 11 per cent should come through promoters' contribution.

The package proposed to raise the standard rate of calculating the permissible return on the capital base to five per cent over the Reserve Bank rate for future investment. The present rate defined under the Electricity (Supply) Act is two per cent above the Reserve Bank rate.

It was proposed that the interest during construction should be capitalised at actual costs. This should also apply to expansion programmes. At present the Electricity (Supply) Act permits capitalisation of interest only for the initial phase of the project at one per cent over the Reserve Bank rate, irrespective of the cost of the borrowings.

The package envisaged that the initial period of licence for private sector power generation would be 30 years to be followed by subsequent extensions, if granted, for 20 years each.

However, the response of the private sector to the invitation to invest in the power sector has been rather poor. Only a few private sector companies have shown interest in setting up power generating units. These include Bechtel, Hindujas, R.P. Goenka group, B.K. Birla group and Nippon Denro.

SYNTHETIC PETROL PROJECT IN BENGAL SOUGHT

Mr. Niren Ghosh, secretary of the Centre of Indian Trade Unions (CITU) has urged Prof. Madhu Dandavate, the Union Finance Minsiter to revive the proposal for a synthetic petrol project in West Bengal.

In a letter to the Minister, Mr. Ghosh has informed that the project mooted way back in 1955 had been declared as viable by two expert committees set up to examine the proposal.

The CITU secretary said that the first committee under Mr. J.C. Ghosh submitted its report in 1956. The report had stated that the project was viable and should be taken up.

Subsequently, in 1974, the Union government appointed another committee under Dr. K.R. Chakraborty to examine the issue. This committee also recommended that a one-million tonne capacity synthetic oil project should be set up. But till now nothing has been done about the proposal. In this context, Mr. Ghosh said that the National Front Government should see to it that the proposal is revived.

MOULDING SOLUTIONS

How does one rid the world of an ever-growing plastic mountain of cartons, bags, tyres and other what-nots? Dump it in the ocean, or even shoot it off in space? Prof. Brucce Naumann has a few answers. Based at the Rensselaer Polytechnic Institute, he has developed a method to separate mixed plastics by exposing them to a particular solvent at a temperature that will dissolve only one plastic at a time in the mixture.

Heating the solvent mixture under pressure and then suddenly releasing the pressure causes the solvent to evaporate from the dissolved plastic and leaves the plastic polymer as a solid residue.

NTC GULBARGA UNIT TO HUM SOON

MSK Mills, Gulbarga, a unit of National Textile Corporation (NTC), will reopen shortly. The State Joint Labour Commissioner, Mr. K.R. Shankaranarayana Rao, told "Financial Express" at Bangalore that the mill, which remained closed since March 30, will reopen shortly following an understanding reached between the management and the workers on April 21 at Delhi.

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BVO ban hits soft drinks' makers hard

The government's recent decision to finally ban the use of brominated vegetable oil (BVO) as an emulsifying agent in soft drinks has left most soft drink manufacturers in a tangle. Though the whole issue of BVO being a cancer causing agent has been debated in courts and by the expert committee of the central committee of food standards, the sudden decision to ban use of BVO has left manufacturers with insufficient time for switching over to a substitute emulsifier, ester gum.

The All-India Soft Drink Manufacturers' Association has contended in its letter to the secretary, Ministry of Health, that before a gazette notification is issued on the ban of BVO, the industry should be given at least three months notice for switching over to a new substitute. Coupled with this, the Association has also contended that time should be provided to exhaust existing stocks of BOV lying with them and also make arrangements to procure the substitute emulsifier, in this case beverage grade ester gum.

The government's latest decision to ban BVO comes as a follow-up of its earlier decision two years back. The banning of BVO has become necessary following a joint FAO/WHO report which found bromine accumulation in the heart of experimental animals after the use of BVO. Despite the absence of any definite pathological effects in man, some countries like Australia, Finland, Norway, Spain, Israel, Kenya and South Africa took immediate remedial action by permitting use of a new alternative weighting agent sucrose acetate iso butyrate (SAIB).

Other large soft drink consuming countries like the US, Canada, Spain, Belgium, the Netherlands and Sweden had permitted use of BVO at 15 ppm level in conjunction with estergum at 100 ppm. India, on the other hand, has been fighting shy of taking a decision following pressure from soft drink manufacturers to first allow the use of ester gum as substitute to BVO before putting a ban on BVO. Ester gum is already in use in India to make chewing gum.

The shaky way in which the government and the soft drink industry have acted knows no parallel, according to medical sources at Bombay. Sources give example of how Perrier, was withdrawn from the market, immediately after it was found to contain traces of benzene. At one shot, 160 million bottles were withdrawn from the market.

Even while withdrawing its products, Perrier maintained throughout that "though there is no health risk in drinking Perrier, we are withdrawing it as a precaution". In India, BVO is used as an emulsifying and cloud stabilising agent in citrus-flavoured beverages like Limca, Gold Spot, Dukes Lemonade, Campa Orange, Tingler, Tripp, Rush etc.

Mr. V.R. Acharya, vice-president research and development, Parle (Exports) Ltd., has claimed that his company would now use a new emulsifier in place of brominated vegetable oil, developed in-house and will remain a trade secret.

9.5 PER CENT INCREASE IN ENERGY GENERATION

The total energy generation in the country during 1988-89 was 221.1 bus showing an increase of 9.5 per cent over the generation in 1987-88.

The increase in thermal generaiton during 1988-89 over the previous year was 5.3 per cent. The hydro generation increased by 21.8 per cent during 1988-89 over the previous year mainly due to the favourable monsoon during 1988-89. This has been stated in the annual report of the department of power in the ministry of energy for the year 1989-90.

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Blueprint for healthy S & T

The Science Advisory Council to the Prime Minister, set up in 1986, on April 21 released its recommendations for achieving a healthy science and technology scenario in the year 2001. The ceremony, at the Raj Bhavan, was graced by the Governor of Maharashtra, Mr. C. Subramaniam.

Some of the key problem areas tackled by the council and its recommended solutions are listed below.

1. Population — It is suggested that the country's population be limited to no more than 970 million by the year 2001. The council cautions that failure to act in time may well result in the country having to provide extra resources for an additional 55 million by that year.

One of the most effective means of curbing population growth, according to the council, lies in educating women. Other recommendations include the amalgamation of health and family welfare, and the abolition of the system of monetary incentives for contraception.

According to the council, monetary incentives foster the impression that the individual is obliging the health system. At the State-level, the system leads to concentration on reporting quantitative tabulations with little or no concern for quality or even veracity.

2. Food — The following recommendations were made to help achieve the target set in the approved paper of approximately 300 million tonnes food per annum by the end of the century.

— The establishment of district level land and water use boards to regulate the use of land and water. The major objective of the water use policy should be to obtain at least four tonnes of grain per hectare annually from irrigated holdings.

— The set up of joint scientist-farmer development centres to create a closer interaction between the two communities and to promote the use of agriculture-related discoveries by farmers.

— The recruitment of professionally qualified youth in rural programmes. This can be done by providing intellectually stimulating and financially remunertive jobs in the rural sector, promoting the well-being of remote areas, overcoming regional imbalances, removing commodity imbalances, and creating an environment for utilising first rate scientific work.

3. Housing — To provide shelter for all, a significant breakthrough in S and T linked to the development of low-cost and alternative building materials is necessary. It is suggested that polymerised materials will improve both the structure and durability of houses and, therefore, more research should be done in this area.

4. Ecology — Continued intensification of resource use has led to a depletion of the capital stock of renewable resources. The council calls for a collection, analysis and interpretation of information concerning all aspects of the environment.

5. Energy — S and T should cover all areas concerning energy, from the exploitation of primary sources to conversion, transmission and distribution. It is suggested that the role of the different sources of energy, namely coal, oil, natural gas, nuclear and renewable resources, be properly delineated in the coming decades.

6. Transport — The railways should be modernised using new light-weight materials in the fabrication of coaches. Roads should be improved using modern materials such as polymerised asphalt. Technological upgradation of buses is also suggested.

7. Communications — It is recommended that all new telephone and other communication services should switch to optical fibre based systems so that by the year 2001 the national communications system will be fully photonic (i.e. run on light beams as opposed to electricity).

8. Materials — It is suggested that a national level body be set up to launch, co-ordinate, review and monitor programmes in the area of advanced materials. Materials recommended for concentrated development include titanium, silicon-based microelectronics, III-V semiconductor compounds, zirconia and carbon composites.

9. Manufacturing — It is suggested that indigenous manufacturing go high-tech with the use of microprocessors, computers, lasers, fibre optics, and robotics.

10. Information technology — The set up of appropriate information systems for all important sectors is called for. Health information systems will be important in generating and disseminating high quality data for analysis, policy formulation and design of health care delivery systems.

Similarly, accurate meteorological data coupled with modern weather prediction techniques and transmission of data through telematic networks, with suitable back-up agricultural support systems, is expected to herald new era in the ability to plan agriculture optimally for a given set of weather conditions.

The above suggestions are hoped to place India in a ''position of price and respect in the world of science and technology by virtue of its scientific achievements and of its presence as an internationally competitive force in atleast some areas of science and technology''.

It is warned, however, that to attain these goals, two traps need be avoided to try and pursue everything that is deemed important, interesting or even feasible, and to over-plan to a degree where flexibility of response is lost and new opportunities cannot be seized. It is suggested that the criteria for choice in fundamental research be promised of achievement of excellence and the existence of special advantages that India or Indian scientists may possess, either because of the situation or because of resources specially available in the country.

It is furthermore suggested that a link be forged between universities and National laboratories such as CSIR, ICMR, ICAR, defence, space, atomic energy, etc. Such a link will be mutually advantageous as it will provide science students with facilities they lack at university. At the same time, the laboratories will be injected with fresh, young minds with novel ideas.

To sustain a healthy environment in S and T, the council suggests that at least two to three per cent of the country's GNP be allocated to this end. Apart from the Centre, individual States are also called to apportion a greater part of their resources to S and T activities.

Finally, it is proposed that a National Science and Technology Commission (NSTC) be established to make sure that adequate S and T inputs are available for economic planning, to assist in determining National directions in S and T and to set the priorities in the plans.

KIOCL DEAL WITH HUNGARY

A $ 100 million deal was signed at Budapest for the import of the iron ore pellets from Kudremukh by Hungary. The contract, signed by the Chairman and Managing Director of the Kudremukh Iron Ore Company, Mr. K.K. Rao, and the Chief of the Danube Iron Works of Hungary, provides for the supply of three million tonnes of pellets from 1991 to 1994.

Hungary is the first country to import iron ore pellets from Kudremukh and is among the biggest buyers of this produce since 1987, when the Indian company was looking for importers. Meanwhile, India has become Hungary's biggest trading partner among the developing countries, according to figures available for 1989.

This position was earlier held by Iran. Giving the figures, Hungarian news agency, MTI, estimated the Indo-Hungarian trade turnover during the year at $140 million which is $20 million higher than in 1988.

KAIFU'S VISIT TO BOOST S & T TIES

The Japanese Prime Minister, Mr. Toshiki Kaifu, will pay a three-day official visit to India from April 29 to exchange views with Indian leaders on regional and international issues, as well as discuss bilateral co-operation in the scientific and technological fields.

The Japanese leader, who will be leading high a level delegation, will have two rounds of talks with the Prime Minister, Mr. V.P. Singh. He will also meet the President, Mr. R. Venkataraman, and the Vice-President, Dr. S.D. Sharma, and address a joint session of Parliament on April 30, it was officially announced at New Delhi on April 25.

The two countries have excellent relations and their trade ties have been steadily growing. Japan is the third largest investor in India. The trade between the two countries is about four billion dollars, which is by and large balanced. India exports diamonds, textiles and chemicals to Japan.

Japan is a founder-member of the Aid India Consortium and has contributed 1047 billion yen in grant-in-aid and technical assistance to India since 1958. The two countries are collaborating in 18 fields, including recycling technologies and disaster prediction.

ONGC SERVICE CONTRACTS FOR LOCAL COMPANIES

ONGC has decided to give a big thrust to the indigenisation of service contracts in five major areas in the next five years. Their projected value will be Rs. 43 crores in 1995.

The identified areas are cementing, mud engineering, tubular inspection, wireless services and geotech services. Some 42 varied services are being regularly used by the ONGC, including charter-hiring of rigs, helicopters, diving services, marine surveys, well logging and production testing.

Earlier, most of the services hired specially in the offshore were from foreign sources which had been getting orders in these fields to the tune of Rs. 550 crores, but thanks to the indigenisation efforts, Indian companies are presently providing services worth Rs. 320 crores.

According to ONGC sources, by the turn of the Eighth Plan the value of the service rendered by the Indian companies will reach the level of Rs. 800 crores.

Of the 42 services regularly in use by ONGC nine have been fully established indigenously. In another 21 services partial capacities have been developed.

Cementing being a crucial operation in the completion of drilling of the wells, ONGC intends inviting bids from Indian firms, to be finalised during this month. ONGC feels, cementing being a high tech area it is ideally suited for joint ventures.

APPOINTMENTS

Mr. T.V. Ramamurthy has been promoted as Addl. General Manager (Finance) at Indian Oil Corporation's Marketing Division headquarters in Bombay.

Solving India's water problems using membranes

Ion Exchange (India) Limited (IEI), a pioneer and leader in water treatment in India, has entered into a five year consultancy agreement with the University of Ottawa, Canada. Dr. S. Sourirajan, Director of the University's Industrial Membrane Research Institute and world renowned pioneer in membrane technology will provide consultancy on membrane development. Dr. Sourirajan discoverer of RO membranes in 1960 at University of California, Los Angeles is internationally known for his work on reverse osmosis and ultrafiltration.

Membranes for 'clean' water

The need for fresh water for potable, municipal, industrial and agricultural applications has been increasing enormously in recent years. Unplanned growth, exploding population, pollution and rapid deforestation have resulted in deterioration of water quality as well as its scarcity. Availability of good quality drinking water is also becoming acute. Since most of the naturally occuring water is either sea water or brackish, desalination using membranes assumes great importance as it enables fresh water to be produced from such saline sources to meet the need for potable and industrial water.

Membranes for domestic water

In areas where water has high dissolved solids causing hardness, membranes can remove upto 85% of the hardness salts and other dissolved solids and 90% of total dissolved organics, bacteria and most viruses. Portable units using these membranes can be effectively used in laboratories, clinics, hotels, offices and households. Such a portable unit is manufactured in India by Hydranautics Membranes India Limited, a subsidiary of Ion Exchange India Limited.

Membranes for pollution control

Apart from desalination of brackish and sea water, other areas of application of membranes which are relevant to India are:

1. Use of membranes to separate and recover valueable chemicals in effluent streams and recycle the water thus conserving a scarce resource.
2. Recovery of valuable metals from effluents in chemical waste streams.
3. Separation of organic mixtures without resorting to distillation, saving thermal energy and preventing deterioration of chemicals.

Hydranautics Membranes India Limited — A joint venture of IEI and Hydraunautics, USA

In collaboration with Hydranautics, USA (now a wholly owned subsidiary of Nitto Denko (Japan), Hydranautics Membranes India Limited near Kalol, Gujarat manufactures state-of-the-art cellulose acetate blend RO membrane elements in India. India is thus the only country and HMIL the 10th company outside USA & Japan to manufacture spiral wound membrane elements on a commercial scale to meet international standards.

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ENTREPRENEURS URGED TO MAKE QUALITY PRODUCTS

Mr. J. Phillip, director IIM Bangalore, urged entrepreneurs to better the quality of their products and thus ensure demand. He was addressing a one day regional conference at the Indian Institute of Materials Management (IIMM), at Kolar on April 21. He said that although the volume of goods in the country has increased, we are unable to compete internationally because of low quality. He called for a more broad based relationship between the suppliers and consumers. Mr. N. Mallya, national president IIMM who also spoke, underlined the need for recognising materials managers in enterprises.

Fresh water through reverse osmosis

Apollo spacecraft carried a small gadget which the former Prime Minister, Mr. Morarji Desai, would have considered unnecessary. This was a reverse osmosis unit which astronauts were to use in case of an unexpected failure of the spacecraft's feeding arrangements. It could convert body fluids into pure drinking water. Of course, there was no occasion to use the gadget.

Membrane, the heart of reverse osmosis process, was born on August 23, 1960, at the University of California, Los Angeles. Late that evening, Dr. S. Sourirajan, an expatriate Indian scientist, was busy with his favourite experiment: converting saline water of the blue Pacific into fresh drinking water. He would feed saline water into his experimental module hoping to get pure water at the other end. On this day, he succeeded.

American and Japanese companies soon commercialised the concept. Today, membranes are million dollar products for companies like Du Pont. Dr. Sourirajan who was in Bombay recently tried his best to popularise the technology in India through lectures.

He presented a detailed paper to the Government on the need to set up a National centre for industrial membranes during the seventies. "It was not even acknowledged", says the scientist who has been living abroad for 35 years.

Water permeating from a dilute solution to a concentrated one is a natural phenomenon called osmosis. This process can be reversed by applying external pressure on the concentrated solution. Called reverse osmosis (RO), it is now widely used to produce fresh water from brackish and sea water.

Today, about two billion gallons of fresh water is produced all over the world by this method from brackish and sea water. Another two billion gallons are produced by industry from effluents and recycled, thereby conserving water.

Apart from producing potable water from brackish water and waste water treatment for pollution control and recovery of water, membranes are now widely employed for separating one chemical from another and recovery of expensive metals from industrial wastes.

Producing fresh water by distillation is 15 times costlier than RO process, one square foot of membrane can produce 25 to 30 gallons of fresh water in a day. Dr. Sourirajan believes that a day will come when membranes will be used to produce petroleum from crude: "Push crude through a membrane and you get aviation fuel", to put it crudely.

Modern dialysis machines employing membrane technology are far more effective and efficient compared to conventional machines. Membrane brain implants have proved effective in correcting epilepsy in animals.

The first membranes were made of cellulose acetate. Today's membranes are made of plastics, ceramics and the like. Dr. Sourirajan explains that membranes work because of "surface tension", but for example, a molecule may be smaller than the membrane pores, but it will not pass through because of the morphology and surface repulsion.

Meanwhile, 125 RO desalination plants set up by the private sector as part of the Government's Technology Mission for Drinking Water, are to be commissioned in the next few months. The water mission will look after 1.5 lakh villages which have no provision for drinking water within a 1.6 km. radius.

The 125 sites were chosen after identifying problems like brackishness, excess fluoride, worm infestation and the like. They are spread over Rajasthan, Tamil Nadu, Maharashtra, Gujarat, West Bengal, Haryana and Pondicherry. The following firms are setting up the desalination plants to produce pure water from brackish water — Hindustan Dorr Oliver, TEAM of Madras, Ion Exchange and Thermax. The Government is reimbursing expenses incurred by these companies.

HUMAN ROBOTS

Robots might step in where men fear to tread, but still their days seem numbered. American engineers are already working towards the next dream of robotics: teleoperators. A page out of sci-fi, these devices will be able to handle tasks with the dexterity of human beings, considerably stealing the thunder of the existing robots.

A person operating these machines would wear a helmet that would receive visual and auditory signals — giving the illusion that the operator is actually in the machine. At the same time, the machine will be able to mimic every move of the human operator. According to the designers of the teleoperators, people would be able to carry out operations from a distance with the same precision as they would from close quarters.

GUJARAT SEEKS IBRD AID FOR POLLUTION CONTROL

The Gujarat Government has submitted a Rs. 33.50-crore proposal to the World Bank for setting up a mobile air pollution laboratory and for monitoring pollution in rivers in the State. The representation had been made get about 75 per cent World Bank aid. This was disclosed by the Gujarat Government when a three-member delegation led by the World Bank Consultant, Dr. Mills, called on the Chief Minister, Mr. Chimanbhai Patel, on April 24. The delegation discussed about the assistance for the upgradation of regional and sub-regional offices and laboratories etc. to make more effective the functioning of Gujarat Pollution Control Board.

Life lingers on despite Chernobyl nightmare

Smiling children skip along dirty paths, kicking up radioactive dust. They throw stones in their radioactive playground, then go home for contaminated meat and milk.

Since cesium, strontium and plutonium descended on their rooftops, gardens, farms and schools four years ago, the people of this Byelorussian village and of scores more in the Ukraine and Russia have been prisoners of Chernobyl.

They are surrounded and continuously bombarded by an enemy they cannot see, smell or hear. They say their government and the world have all but forgotten them.

They grow potatoes and barley in their gardens, even though the radiation level is 40 curies, nearly three times the danger level. They can recite the figures like scientists but do not seem fully aware of the threat.

Nadezhda N. Dmitrochenko of the local governing council said she tries to explain the dangers of radiation, but "people still don't know what this is... It does not glow and it doesn't whistle".

On April 26, 1986 an explosion and fire destroyed one the of four reactors at the Chernobyl nuclear power plant in the Ukraine, 200 km southwest of Noviye Gromyki.

The official death toll from Chernobyl remains at 31 but Soviet newspapers said last fall it had risen to 250. Scientists still predict thousands of deaths will be traceable to the accident.

After years of passivity, the people affected are speaking out. Protesters demand that officials who concealed the extent of the danger and delayed evacuating contaminated areas be brought to trial. They want medical care for victims and supplies of radiation-free food.

About 70 per cent of the Chernobyl radiation fell on Byelorussia and contaminated one-fifth of the arable land, an area where 2.2 million people live.

Immediately after the accident, about 25,000 Byelorussians were evacuated, but only last year did officials admit the full scope of the contamination and decided to resettle 110,000 more. The resettlement will take five years. People eat and breathe nuclear poison in the meantime.

The programme appears poorly run. Some evacuees are being resettled on land that also is contaminated and the government is building new homes, schools and offices in areas that are being evacuated.

Most families with young children have been moved out of Noviye Gromyki since resettlement began on January 1.

Those still waiting feel abandoned and frightened. They cannot move on their own because housing must be found for them.

"We sit and cry" said Claudia A. Kostochka, 75, who was on a bench with two other women, sobbing. "They don't won't take us. We're pensioners."

"I lived almost a whole century here, raised a son and daughter here. Two weeks ago they closed our store, so we're eating cabbage and cucumber preserves from last year. We don't know whether it's dangerous or not, but we have to eat".

A farmer said the milk from his cows was too radioactive to drink, so he sells it to the government, which makes it into the butter. He said the butter was supposed to be safe.

Many people said they did not bother to have their home produce checked at a local radiation laboratory. Soil and dust carry radioactive particles.

The only paved surfaces in Noviye Gromyki are one street and the grade school playground at No. 13 Lenin Street. Winds blow dust from the dirt roads and fields onto the asphalt and the people and into their homes.

Residents are warned not to gather firewood from the highly radioactive forests nearby. Burning it makes their stoves into what specialists have called "mini reactors".

Villagers are supposed to wash frequently, but they are allowed only one bar of soap a month, the same as anyone else.

Each household gets 30 roubles a month from the government to buy uncontaminated food, but it is hard to find.

Several students said they ignored warnings and rode bikes in the forest. They complained of headaches and exhaustion which they blamed on fallout.

To the list of ailments the Chernobyl generation suffers school principal Nikolai N. Shatilo added bloody noses, swollen thyroid glands and vision loss. The radiation level at high school No. 1 is two to three times above normal.

"We can't provide normal conditions in school", he said. "There's only one thing to do: Take them to a clean zone. We must save the children. They are our future".

One student said she was bitter because no one seemed to care, not even the doctors who examine her class twice a year. A 16-year old boy said, "We're sick and tired of all the checkups. What are they for? All they do is keep saying everything's normal".

LOW-GRADE GUJARAT BAUXITE

Market found for export

Eventually foreign markets have been found for the low-grade bauxite which has been stockpiled as waste in great quantities at various mines in Gujarat. The Minerals and Metals Trading Corporation of India (MMTC) has created markets for the inferior bauxite in West Asia and Scandinavian countries.

The border district of Kutch has a vast bauxite reserve of 30 million tonnes followed by Jamnagar in Saurashtra region with over 10 million tonnes, according to a spokesman of the Gujarat Mineral Development Corporation (GMDC). In Kutch, the GMDC exploits the bauxite mines while in Jamnagar largely private lease holders recover this mineral. The exploitation of the higher grade bauxite which alone is in demand within the country also generates low grade bauxite. The stockpile of the low grade bauxite with the GMDC at Kutch is estimated at over two lakh tonnes and with the private lease holders at Jamnagar even more.

The first shipment of the GMDC bauxite is expected to leave Porbandar port within a month. The Jamnagar lease holders have already sent some three shipment. The export of the entire low grade bauxite of about five lakh tonnes from Kutch and Jamnagar is expected to take a couple of years because of the lack of a developed port along the Saurashtra coast for berthing more than one ship at a time.

The finding of the foreign markets for the low grade bauxite for use mainly in cement factories has given a boost to the bauxite mine holds all over the country. Besides earning valuable foreign exchange the mine holders will now be able to retrieve for exploitation the equally precious mining space occupied by the waste dumps.

The GMDC spokesman could not readily give the figure of foreign exchange earnings from the low grade bauxite exports.In Gujarat small deposits of bauxite have also been found in Bhavnagar, Sabarkantha, Surat and Bulsar districts. The unique feature of Gujarat bauxite is said to be its existence at the ground level. Bauxite deposits are generally found on the top hills and mountains.

Kutch is rich not only in bauxite deposits but also in lignite deposits. The Gujarat Electricity Board after deciding to set up an experimental thermal power station near Panandhro lignite project is not exploring the possibility of putting up a large lignite-based power station there.

The Panandhro lignite is considered as good as coal from the viewpoint of its heat value. The Panandhro complex has a proven deposit of 100 million-tonnes of lignite and the GMDC is now poised to enter the next phase of its development. The entire area around Panandhro extending up to Lakhpat has been taken up for exploration by a Gujarat firm. A detailed drilling operation is underway.

The corporation has built a new jetty at Koteshwar port for transportation of lignite by sea route to industries situated on the coast of Saurashtra.

The GMDC expects its Panandhro project to form a nucleus for further industrialisation of the remote area of Kutch where grid power is supplied from a far off corner.

The corporation has also geared up the development of its multi-metal project at the pilgrim centre Ambaji in another border district of Banaskantha in collaboration with the Hindustan Zinc Limited (HZL), a government of India undertaking.

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UN meet call for global co-operation

A special session of the UN General Assembly opened on April 23 with a plea for international economic co-operation to close the ever-widening gap between the world's haves and the have-nots.

"The time has come", said the UN Secretary-General, Mr. Javier Perez De Cuellar, "for international financial institutions and governments to reflect on the experiences of the past in order to develop a new vision of a future with more favourable conditions for multilateral developmental cooperation".

The session scheduled to end on April 28, is being devoted specifically to the revitalisation of economic growth and development of the developing countries. Speaking on behalf of the Group of 77 (G-77) developing countries, Bolivia's Minister of Planning and Co-operation, Mr. Enrique Garcia, singled out four of the 'obstacles' that require immediate removal.

The Minister said these were: solving the problem of debt, reversing the current protectionist practices, applying policies and instruments which endow the terms of trade with greater stability, and fourth, increasing net flows of capital and making international co-operation more effective.

Calling for a change in "the international rules of the game", which are invariably weighted heavily against Third World nations, Mr. Garcia said the G-77 approaches the special session with high hopes because it may represent a historic crossroad that will define future lines of international co-operation to stabilise the world, revitalise the development process, and narrow the gaps that separate the poor countries from the rich.

"These things are essential" he said, "in order to consolidate ideological pluralism and democracy and in order to set the world on a course to a more prosperous and just 21st century". The special session was taking place, said Mr. Perez De Cuellar, when governments around the world were reconsidering the uses to which they put their resources.

He pointed out that the reduction in the number of armed conflicts and the relaxation of political tensions would provide governments with an opportunity to reallocate resources from military purposes to pressing economic, social and environmental needs that all recognised.

He added that commitments were needed to convert armaments industries to non-defence production and to give higher priority to the economic and social programmes in national budgets.

A proposal in the draft declaration for the special session specifically refers to the financial resources released from the reduction of military expenditures and says that part of it should be channelled into international development.

The draft also calls on the special session to consider the feasibility of a UN "disarmament for development fund". Meanwhile, representatives of developing countries also singled out the debt problem as one of the biggest obstacles to Third World economic development.

INDIA'S FOREX LIMITS ZERO IN WORLD TRADE MARKET

India's foreign exchange reservations are zero in the world trade market since the export policies of our nation are limited to meet the need of foreign exchanges, said Mr. Viren Shah, eminent industrialist and president of the Association of Chamber of Commerce, apex body, said at Kolhapur on April 22.

Mr. Shah, speaking as chief guest at a seminar on export organised jointly by the Kolhapur Engineering Association (KEA) and the Confederation of Engineering Industries (CEI) southern, at Rambhai Samani Hall at Kolhapur, said at present the country's value in the world trade market was only 0.5 per cent only because of the wrong attitude of the previous government towards export policies.

He emphasised the need to create awareness among industrialists, traders and other producers to produce good-quality products at low prices and ensure timely supply.

Presiding over the seminar, industrialist Dr. Nilkanthrao Kalyani urged industrialists to adopt new modern technology and machinery to remain in the race of world open market trade.

Dr. Kalyani, who is also chairman of the National Export Committee said the nation's development in industry as well as agriculture in the last 25 years was limited and not up to standards of international trade.

MUSHROOMING GROWTH

The recent efforts of the CSIR complex at Palampur should go a long way in boosting the morale of mushroom growers, especially in the hilly regions. A low-cost compost making unit designed by the CSIR scientists has recently been commissioned at the hill-station to supply high quality growers.

With the capacity to produce 60 tonnes of compost per month, it can meet the requirements of almost two dozen small-scale mushroom farmers. Several benefits accrue from this new unit.

Secondly, the unit, built with totally indigenous material and based on the latest bulk pasteurisation techniques, has a comparatively low investment outlay of Rs. 2.5 lakh only.

Qualifying limits may be eased for export houses

A reduction in the qualifying limits for export or trading houses, which were raised in the new import and export policy, are under consideration by the authorities concerned, the Chief Controller of Imports and Exports (CCI and E), Mr. Tejendra Khanna, said at New Delhi on April 23.

CCI and E was also considering relaxing the net foreign exchange earnings stipulation for garment exporters to enable them to use the newly introduced blanket advance licensing scheme. As things stand, an exporter has to show a net foreign exchange earning of Rs. 10 crores or more, a feat only few garment exporters can achieve.

Speaking at a workshop organised at New Delhi by the Federation of Indian Export Organisations, Mr. Khanna said the requirement of indigenous clearance, where imports of capital goods under the open general licence was concerned, had been done away with.

This was a procedural simplification as the OGL list comprised of those items which were not available in the country, and as such it was the cause of unnecessary paper work.

Where exports to rupee trade areas (RTA) were concerned, he said an additional obligation to export an equivalent amount to general currency areas (GCA) would be imposed only if the foreign exchange outgo was very high.

Such cases where the item for export to RTA had a high import content, they would be referred to CCI and E. Other cases, where the import content was not high, they would be cleared by the regional licensing authorities.

Mr. Khanna said the two per cent flexibility in Rep licences given to garment exporters was insufficient to allow them to import all their requirements of embellishments. This was likely to be changed.

He also said that his department was working with the Department of Revenue to iron out bugs where the working of the import-export pass-book scheme was concerned. Many such passbooks were held up as they could not be closed unless all imported inputs had been physically accounted for.

The president of the Federation of Indian Export Organisation (FIEO), Mr. Ramu S. Deora, reiterated his call for a reduction in the eligibility norms for export and trading houses. These had accounted for exporters of Rs. 18,000 crores up to March 31, 1990.

The rate of growth an export house would have to achieve to qualify under the new conditions was 58 per cent per annum. The national rate of export growth was 38 per cent, and thus there was no comparison between the two.

PLAN PANEL: PM FIRM ON STATUTORY STATUS

The Prime Minister Mr. V.P. Singh, has reiterated his election promise to give a statutory status to the Planning Commission in Parliament on April 23.

For this the Commission which is an extra-constitutional body, will have to be included in the Constitution by an Act of Parliament.

If this is done, the advices of the Commission would be mandatory to the Government. Also, its role and functioning would be defined in the Constitution.

This would also mean that the body would be accountable to Parliament.

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Steel price hike on cards

An increase in steel prices seems to be in offing, particularly in view of the hike in various input costs like coal, freight and power rates. The joint plant committee (JPC) would favourably respond to the needs of price rise by the integrated steel plants of Steel Authority of India Ltd. (SAIL) where such an increase in prices is warranted because of the input costs on which these plants have no control, according to Steel Ministry sources.

The Ministry feels that a rise in steel prices would be imperative in view of the massive modernisation and expansion of SAIL plants under way at an estimated cost of over Rs. 12,000 crores and also since most of these funds have to come from SAIL's internal generation.

It is argued that if an increase in steel prices is held back too long, the internal funds generation would not be forthcoming. Also, it is pointed out that in the early 70s and 80s, steel prices were not increased for long periods which resulted in low generation of funds and consequently, leading to a cumulative effect on efficiency and viability of these plants.

During the Eighth Plan, the Ministry is planning to expand the steel-making capacity by nine million tonnes from the present level of around 15 million tonnes to around 24 million tonnes by 1994-95. The outlay for the steel sector during the next Plan has been fixed at Rs. 29,000 crores. Of this, around Rs. 20,800 crores would be provided for the public sector steel plants, Rs. 2,200 crores for the private sector (TISCO) and Rs. 6,500 crores for the secondary steel sector.

According to the steel capacity expansion plans chalked out by the Ministry, the SAIL capacity is to go up from the present level of nine million tonnes to 13 million tonnes, TISCO from 2.3 million tonnes to three million tonnes the Visakhapatnam steel plant from nil to 2.75 million tonnes and the secondary steel sector from three million tonnes to six million tonnes.

Instead of estimating production programmes of individual integrated steel plants, the emphasis during the Eighth Plan is on factors such as technological options, upgradation of quality of inputs and a sufficient thrust to research and development. Special emphasis is to manufacture high quality products to meet increasingly sophisticated economy.

Another major thrust is to replace export of raw materials necessary for producing iron and steel by export of semi-finished goods thus adding value within the source of our economy. The Ministry also plans to export around two million tonnes of steel by the end of the next Plan.

To achieve these objectives, an integrated programme is being implemented which includes massive development of the sponge iron industry to reduce import of scrap, a substantial increase in production of foundry and other grade pig iron in the secondary sector, upgrading the quality of inputs required for iron and steel making, production of special and high technology steel and special steel alloys and strengthening and expansion of the secondary sector to bring the industry on par with the international standards.

Necessary policy changes are envisaged with a view to achieving these objectives. This includes imports of high quality raw materials, like coal, to improve the productivity, a forward looking and progressive custom duty/-excise duty required to reduce financial costs and creation of substantial iron and steel making capacity in the private sector.

The basic premise on which projections were made in the previous Plans resulted in grossly under-estimating the demand for all kinds of steel in the economy.

The approach of the Eighth Plan has put aside an unduly conservative approach as iron and steel is considered a basic raw material for growth diversification and modernisation of economy.

CASE TO CUT UTENSIL-GRADE STEEL PRICE

The recent reduction in the price of Salem steel appears to have created some confusion in the market. The consumers had hoped that the price of steel utensils will also come down. But it had not.

It is pointed out that the price reduction of Rs. 2,000 per tonne is only for nickel-free and industrial grade stainless steel. According to the Tamil Nadu Metalware Manufacturers and Merchants Association, there is, however, scope for reducing the price of utensil-grade stainless steel also.

It is explained that Steel Authority of India Ltd. marketed this steel at Rs. 49,000 per tonne in 1987 when the import duty of nickel was 95 per cent. Since then there have been price revisions almost every month and steel prices scaled to an all-time high of Rs. 92,000 per tonne in January, 1989. It was reasoned then that this had been necessitated by the high price of nickel in the international market, quoted at $19,100 per tonne.

Now, in spite of the fall in nickel prices by 50 per cent to just $9025 a tonne in the international market, and the reduction of import duty from 95 per cent to 70 per cent, the price of utensil grade stainless steel is still high at Rs. 88,250 a tonne.

The association believes that now the price can be brought down to Rs. 65,000 per tonne.

Carbon black: imports avoidable

Carbon black is an important raw material required for the production of tyres, tubes and other rubber goods. Presently the domestic carbon black industry consists of seven units with an estimated installed capacity of 175,000 tonnes. Production during 1988-89 was 120,000 tonnes and capacity-utilisation amounted to 68.6 per cent.

However, looking to the future demand for the commodity and the fixation of minimum economic size of 50,000 tonnes for each unit (350,000 tonnes for seven units), the present capacity of 175,000 tonnes is quite inadequate. It is, perhaps, in keeping with the need for stepping up production that the government recently decided to delicense the carbon black industry.

Carbon black is the outcome of thermal decomposition, natural gas and petroleum oil. It is used in tyre threads, belt covers, other abrasion resistant rubber products, as reinforcing agents in plastics, as colorant for printing inks, etc.

During the eighties, the average capacity-utilisation in the carbon black industry was around 62 per cent. It touched the low of 55 per cent in 1981-82 and high of 69 per cent in 1988-89. In absolute terms, the aggregate capacity increased from 1,06,000 tonnes in 1980-81 to 1,75,000 tonnes during 1988-89, i.e. an increase of 65.1 per cent; production went up by 79.1 per cent from 67,000 tonnes in 1980-81 to 1,20,000 tonnes in 1988-89.

During 1987-88, there was a shortage of 'hard grade' carbon black which is used in the manufacture of bus/truck tyres. This was owing to the targeted increased production of bus/truck tyres. To tideover the shortage, manufacturers of bus/truck tyres were allowed to import high grade carbon black. However, the landed cost of imported carbon black is considerably higher than the domestic price due to high import duties. For instance, while the landed cost of imported N-220 grade carbon black is Rs. 25717 a tonne, its domestic price is Rs. 23699 a tonne. Similarly, imported N-330 grade carbon black costs Rs. 23893 a tonne and domestic market price is Rs. 19535.

It is argued that the present level of carbon black supply is sufficient. The industry is of the opinion that there should not be any new entrants. On the other hand, to meet the future demand, the government has given its approval for the additional capacity of 78,000 tonnes.

Even if the targeted capacity addition takes place within the stipulated period, the anticipated demand for the commodity from the tyre and non-tyre sectors will still remain unfulfilled to a great extent. Estimated total demand for carbon black by 1994-95 is expected to reach 2.08 lakh tonnes and higher at 2.86 lakh tonnes by 1999-2000. On the basis of an optimistic capacity-utilisation level of 80 per cent, the likely output by the end of the Eighth Plan may not be more than 2.00 lakh tonnes. This means continued imports of carbon black in the coming years too.

Of the aggregate annual requirements of carbon black, 70 to 75 per cent is consumed by the tyre sector. The tyre sector, in turn, has been importing about 10,000 tonnes in a year. The import needs of the tyre sector is expected to more than double by the turn of the century.

In view of the existing shortfall in domestic output compared with demand, there have been no exports of carbon black in the recent years. Only during 1986-87 a negligible quantity of 7 tonnes of the commodity valued at half a lakh rupees was exported to Bangladesh.

Indian carbon black is outpriced in the international markets. This is because the country has to import the feedstock required for its production, the landed cost of which is very high. As a result, the price of the end-product will also be correspondingly higher vis-a-vis the international price.

The domestic prices of carbon black have nearly trebled during the eighties. From Rs. 9,251 a tonne during early 1979, the price more than doubled to Rs. 21,042 by 1985. As of May 1989, the price obtaining was Rs. 27,266 a tonne.

Table 1
Production of carbon black
('000 tonnes)

Year	Installed capacity	Production	Capacity utilisation (%)
1980-81	106.0	67.0	63.2
1981-82	106.0	58.0	54.7
1982-83	106.0	68.0	64.1
1983-84	115.0	74.2	64.5
1984-85	154.7	92.1	59.5
1985-86	154.7	93.5	60.4
1986-87	154.7	96.8	62.6
1987-88	155.0	100.0	64.5
1988-89	175.0	120.0	68.6

Table 2
Prices of carbon black
(Rs./tonne)

Year	Price (Rs)
1.1.79	9251.06
11.2.80	13502.84
16.1.89	20344.22
3.5.82	20344.22
19.2.89	21042.42
31.8.87	24,003.72
1.3.88	24160.27
15.5.89	27266.07

Recently, the government took the decision to delicense the carbon black industry. Though the objective behind this measure is to bring about price stability and fair competition for improv-

Table 3
Carbon black demand projections

('000 tonnes)

Year	Total requirement	Of which tyre requirement	Less tyre company import	Domestic requirement
1989-90	136.1	94.5	10.4	125.7
1990-91	146.2	102.6	11.3	134.9
1994-95	207.7	155.5	17.1	190.6
1995-96	224.1	164.3	18.1	206.0
1999-2000	286.2	209.5	23.0	263.2

ing quality through higher production, this may have adverse effects also. This is because already there is sufficient capacity which is partly underutilised. Any new addition to capacity unaccompanied by efforts to step up output will mean continued dependence on imports to meet the growing demand from the tyre and non-tyre sectors. To avoid undue dependence on imports, some tyre manufacturing units have plans to have their own captive carbon black producing plants.

The government has taken certain positive measures like allowing the import of high BMCI (Bureau of Mine Correlation Index) carbon black feedstock, so that production capacity is fully utilised and demand for carbon black of all grades is adequately met. At the same time, efforts are also being made to maximise the production of BMCI feedstock from indigenous refineries.

Taking into account the existing situation in the carbon black industry and projected demand for the product by the turn of the century, it is necessary that there is better utilisation of capacity.

Table 4
Seven units producing carbon black

1. Philips Carbon
2. United Carbon
3. Oriental Carbon & Chemical
4. Gujarat Carbon/Consolidate Petrotech
5. Carbon & Chemical
6. Ralson Chemicals
7. Hitech Chemicals

SIX ITEMS EXEMPTED FROM IMPORT DUTY

The Finance Ministry has exempted six items from import duty for manufacture of final products which are subsequently supplied to 100 per cent export-oriented units (EOUs) or to units set up in free trade zones (FTZs). For the purpose, a special appendix 13-G has been added in the new export policy.

These items are corrugated cartons, tin containers, plastic extruded/moulded/fabricated products, multilayer laminated collapsible tubes, circular diamond saw fitted with segments and segments of circular diamond saw.

The Commerce Ministry had in fact recommended duty exemption for all raw material imports used for manufacturing final products which is supplied to EOUs and FTZs to boost indigenous procurement by such units.

According to the Finance Ministry notification no. 162/90, the import of these items for manufacturing final products for supply to FTZ units or 100 per cent EOUs would be exempted from the whole of the customs duty.

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Highlights in Chemical Technology (Part 1)

HARWELL ON LINE COAL ANALYSER ON TRIAL IN THE UK

An on-line coal analyser system designed by the Nuclear Applications Centre at Harwell Laboratory (UK) has been installed at Didcot power station for a 10-week trial period. Knowledge of coal composition is a major factor in determining plant control operating decisions; such information can also be used for commercial evaluation of the coal supply. Significant advantages can be achieved from this new on-line coal analyser.

The system uses nuclear technique for multi-element analysis. With a throughput of 60 tonnes an hour the prototype system can analyse a complete 20 tonne road-borne delivery of coal in 20 mins. The analysis gives information on calorific value, ash content and moisture, in addition to details of element such as sulphur and chlorine.

The system works by 'interrogating' coal supplies using neutrons from a radioisotope source located within a shielded container. The interaction of neutrons with atoms of coal elements produces gamma rays which are detected and converted to electrical signals for data processing. The coal analyser research was funded by Cogent Ltd. (UK), a technology transfer subsidiary of Legal & General Assurance Plc. (*Atom*, 3/1990, p. 3).

PETRESA (SPAIN) UNVEILS A NEW ALKYLATE PROCESS

Madrid-based Petroquimica Espanola S.A. (Petresa) of Spain has recently unveiled a new process for manufacturing linear alkyl benzene (LAB) used to produce linear alkyl benzene sulphonate (LABS). The company reports the difference between the new process and traditional ones is that Petresa's technology uses a solid fixed-bed catalyst.

Catalysts employed in existing commercial production are hydrofluoric acid and aluminium trichloride, which must be continuously regenerated or recovered in special installations, Petresa reported. The new catalyst is inert and contained in a fixed-bed reactor similar to petroleum/petrochemical processes according to the company. Petresa is operating a pilot programme based on the new process at its facilities in San Roque, Spain. (*JAOCS*, 11/1989, p. 1566).

A NEW ACID HYDROLYSIS ROUTE FOR EXTRACTING SUGARS FROM WOOD CHIPS DEVELOPED IN FRANCE

A new acid hydrolysis process developed in France yields 80 per cent of the available sugars in feedstock (wood chips or agricultural waste) against about 50 per cent for conventional acid hydrolysis, according to the developer, Bertin at Compagnie (Versailles, France). The developers attribute the boost to two factors: short resistance time (10-15 minutes) in the digester, limiting degradation of product sugars and continued washing of the feedstock to desorb sugars from the solids.

In a pilot unit, 200 kg/h of wood chips are softened and deaerated by 100°C steam, then conveyed upward in a digester (at 120-140°C and 2-3 bars) against a counter current flow of 0.3 wt per cent sulphuric acid solution. This converts hemicelluloses into sugars and beta cellulose and 6-10 per cent of the wood's beta cellulose into glucose. A second digester converts the remaining beta-cellulose to glucose.

The product is 100 l of a sugar solution. A 3000 tonnes/year (sugars) commercial plant will start up within three years. (*Chem. Eng.*, 1/1990, p. 23).

JAPAN UNVEILS CFC DISPOSAL TECHNOLOGY

Japan's National Chemical Laboratory for Industry, has developed new means for decomposing and neutralising CFCs. The first technology consists of combusting gaseous CFC with methane or other fuels, whilst the second mixes liquefied CFC with highly reactive supercritical water and decomposes the CFC under conditions of 400°C and 360 atm., after which the generated hydrogen fluoride is recovered as useful fluoride. (*Mfg. Chemist*, 2/1990, p. 9).

TWO NEW ROUTES TO SILICON FROM SILICA UNVEILED BY DOW CORNING

Two new routes to produce chemical grade silicon from silica have been recently unveiled by Dow Corning Corp. (Midland, Mich., USA). Dow uses silicon in its silicon products and supplies it to the semiconductor industry.

Both the new routes promise to have lower capital costs than the conventional energy intensive method, in which quartz is smelted in an electric arc furnace, using coal and wood chips as reductants. Both routes have been tested by Dow at the laboratory scale and one selectively will be commercialised if the three year pilot project is successful.

One process substitutes plasma torches for an electric arc. It operates at a much higher temperatures than the conventional 2100°C. The other new method is a modified version of the electric arc process. (*Chem. Eng.*, 1/1990, p. 25).

SOOT CONVERTED TO DIAMONDS

Soviet researchers have produced

diamond powder from carbon soot using only a conventional laser. Traditionally, synthetic industrial diamonds are made by subjecting graphite to very high pressures and temperatures. But Boris and Dimitu from the Institute of Physical Chemistry of the USSR Academy of Sciences, produced synthetic diamonds using only a medium powered infra-red laser, at room temperature and atmospheric pressure.

In their new method, the Soviet scientists heated carbon soot by passing it slowly several times through the laser beam. The beam was focussed with a sodium chloride lens to give it an intensity of 1500 watts per sq. cm. This heats the soot to a temperature of around 2800°C.

The researchers found that cooling the soot rapidly transformed it into diamond powder that was free of the nickel and nitrogen impurities that give normal synthetic diamonds their yellow colour. The process also produced other high pressure forms of carbon, such as chaoite and lonsdaleite.

Using the same method, the Soviet researchers also transformed other substances into much harder phases which are attainable at present only by applying high pressures. They changed boron nitride into cubic boron nitride and quartz into stis hovite and coesite.

Now the above experiments have been repeated with new innovations by Rustum Roy of the Materials Research Laboratory at Pennsylvania State University. He has produced even higher pressure forms of carbon than the Soviet researchers using pulsed lasers at higher power.

Roy reports that the high energy flux into the carbon from a laser is vital in this technique. The carbon would normally expand as it heats up, but when heated by the laser it cannot expand fast enough, so great pressures build up, forcing the carbon atoms into high pressure phases. At present too little of the carbon is converted to diamond to be useful.

It is, however, a real new phenomenon and a fantastic discovery that should stimulate researchers in materials science for further research. If laser light can transform solid state materials, the method can be used in future as a general tool in material science. It may even be able to produce phases that are unattainable by any other means. (*New Wk.*, 1/27/90 p. 38).

A NOVEL POLYMER BASED METHOD FOR PRESERVING OLD BOOKS

Scientists at Surrey University (UK), have developed a method of preserving old book pages by irradiating monomers with gamma rays, turning them into polymers which coat the paper. The cost is estimated at $4.50 to $8 a book as compared with $48 a book for microfilming and up to $480 a book for resaturation. (*CMR*, 2/12/90, p. 35).

CHEAP MAN-MADE DIAMOND FILMS MAY SPAWN A REVOLUTION IN ELECTRONICS

Inexpensive production of films of diamond-like materials may have greater commercial impact than advances in superconductivity and may even rival the impact of silicon and aluminium, according to recent report from leading research firm Frost & Sullivan Inc. (USA). Diamond, if manufactured cheaply, offers a plethora of properties. It is an electrical insulator, yet it dissipates heat faster than silver or copper allowing much denser packing of electronics components. Its fractional properties are similar to teflon. It is biocompatible and it has the widest known range of optical transmissivity, including resistance to the radiation of nuclear blasts.

The report foresees semiconductors as the most promising applications for diamond and says chips made of single crystal diamond run faster and cooler than ones of silicon or gallium arsenide. The diamond film market is currently limited to a diaphram for loudspeakers and ultra-thin windows for X-rays, but diamond coated tool bits and CVD diamond heat skins are being readied for the market place.

Japanese firms lead in technologies for manufacturing diamond films, but US firms are catching up. Several problems remain, especially the poor adhesion of diamond films to other materials, high deposition temperatures and a lack of understanding of how diamond films grow. (*CMR*, 2/12/90, p. 36).

BATTELLE DESIGNS HYDROGEN AEROSOL PROPELLANT

Battelle Research Institute (Frankfurt, W. Germany) claims to have devised a way of using hydrogen as a propellant in aerosol sprays. The Institute believes hydrogen offers an environmentally friendly and safe alternative to CFCs or butane.

Key to the new design is storage of the hydrogen in an iron/titanium lattice. When triggered, the metallic lattice releases the hydrogen at constant pressure (about 4.5 bar) until the container is completely discharged. In this respect, the new concept has the same advantages as CFCs. Further, because no hydrogen is released into the atmosphere, the Institute claims the sprayer is safe even at high temperatures.

Battelle envisages the hydrogen storage lattice either integrated in the sprayer or attached to it. It also believes the concept is compatible with all currently available spray systems. In particular, the Institute believes a hydrogen propellant has potential in medical sprays.

The storage lattice can be designed to be refillable, bringing costs in line with those of CFC sprays. Battelle hopes to commercialise the technology within two years. (*ECN*, 2/19/90, p. 23).

RHONE POULENC ESTABLISHES DEVELOPMENT LABORATORY FOR PRODUCING SUPERCONDUCTING POWDERS ON A COMMERCIAL SCALE IN USA

Lack of consistent quality materials, lot-to-lot on a timely basis has been one of the stumbling blocks that has dampened the pace of research in high temperature superconductivity since they were discovered three years ago. Therefore, Rhone Poulenc has recently established a development laboratory in USA to provide custom made ceramic powders required for high temperature superconductors in research and industry.

The new laboratory is turning out high purity superconductor ceramic powders in volume, through a proprietary wet chemical process. The powders are the building blocks for fabricating thick and thin film circuits and bulk ceramic parts such as resonators and coils. The process is highly flexible allowing the laboratory to supply raw materials in various particle size and in varying degree of purity, and in different ratios of chemical constituents. Most research laboratories require only tens of kilograms of superconductor materials per year and the Rhone Poulenc lab can produce that in a few days.

Interest for applications development in the industry continues to centre on yttrium-barium-copper oxide (1:2:3 compound). The laboratory's primary focus will remain on the 1:2:3 compound which the company markets under its 'superamic' Y123 name. (*CMR*, 2/5/90, p. 20).

WORLD'S FIRST ENVIRONMENTAL ENGINEERING DICTIONARY PUBLISHED IN USA

The world's first dictionary of 630 pages covering more than 6000 environmental engineering terms has been recently published in USA. It will be a personal interpreter for pollution control jargon on the subject in vogue at present in USA.

It is priced at $68 plus shipping and forwarding charges. It is available from Government Institutes Inc., 966 Hungerford Drive No. 24, Rockville, Md 20850 USA.

ARGONNE NATIONAL LABORATORY UNVEILS SUPERCONDUCTOR WITH GOOD FLEXIBILITY

Scientists at Argonne National Laboratory (Illinois) have recently developed a foil-backed superconductor that can handle 10 times the amount of current carried by household wiring and is flexible enough to withstand bending. The innovation basically involves bonding the brittle ceramic to a backing of silver foil.

For making this superconductor the Argonne team prepared a paste containing the Y-Ba-CuO '1-2-3' superconducting compound, a fine silver powder and a wetting agent. The paste is then squeezed onto a thin ribbon of silver. Finally, the ribbon paste combination is fired at a temperature just below silver's melting point (about 1750°F). In the process quarter-inch ribbon of 0.003 in. thick silver foil is coated with a mixture of 1-2-3 superconductor and silver powder. This composite material can be formed into coils before firing, making it a good candidate for electric motor windings.

According to Dr. Rogers of Argonne, the coated ribbon can be bent into relatively tight coils quite easily if done just before firing. 'Should microcracks occur in the stressed superconducting material, the silver, both as a foil backing and in fine-grain form mixed with the ceramic serves to carry the current past the break' explains Rogers. (*Ceramic Ind.*, 11/1989, p. 16).

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PHASEOUT OF METHYL CHLOROFORM & OTHER FIVE FULLY HALOGENATED CHLOROFLOUROCARBONS BY 2000 AD IN USA

The US Government has finally voted for a phaseout of methyl chloroform and five fully halogenated chlorofluorocarbons (CFCs) by 2000 A.D. These chemicals are considered the primary culprits in the destruction of the ozone layer.

The US has proposed that methyl chloroform be added to the Montreal protocol and phased out in concert with other Western industrialised nations stating that humanity can live without methyl chloroform but humanity cannot live without the ozone layer, which shields the earth from the sun's cancer-causing UV radiation.

USA is by far the largest producer of methyl chloroform worldwide. It produces 41% of total world production. Dow Chemical (USA), with a 500 million pound per year plant at Faceport, Texas is the world's largest producer, followed by PPG Industries Inc., and Vulcan Chemicals Division of Vulcan Materials Co. (*CMR*, 2/5/90, pp. 5, 42).

A SCIENCE PARK TO PROMOTE TECHNOLOGY TRANSFER ON THE HORIZON IN THE USSR

The first science park in the Soviet Union is coming at a 62 acre site near Moscow. The complex, which will cost some $25 million, is an initiative of Soviet Government and a consortium of Italian companies Grassetto Costruzivni, Ente Nazionale per Energie Elecтricia (Italy's state owned producer and distributor of electricity) and Iritech, a venture capital concern.

The complex will include labs and workshops, where Soviet inventions will be on display for commercialisation outside the country. Also included will be a conference centre, lecture halls and offices and housing for company executives interested in doing business in the USSR. (*C & EN*, 2/26/90, p. 30).

FOURTH INTERNATIONAL FORUM ON ELECTROLYSIS IN THE CHEMICAL INDUSTRY

The fourth international forum on electrolysis on the chemical industry is scheduled to be held from Nov. 11 to Nov. 15 this year at the Bahia Mar Hotel and Yachting Centre, Fort Lauderdale, Florida, USA. Electrochemical technology is a clean technology producing very little or no pollution. Therefore, it should be of particular interest to those keen on reducing industrial pollution. The above forum has therefore, selected this topic under title 'Electrochemical Technology for a Clean Environment'.

Under the present awareness for cleaner environment, the chemical processing industry should focus attention in electrochemical technology and develop newer proces based on electrolysis in future. For further information contact Dr. Norman Wemberg, Electrosynthesis Co. Inc., P.O. Box 430, East Amherst, New York 14051, USA. (*ECN*, 2/19/90, p. 14).

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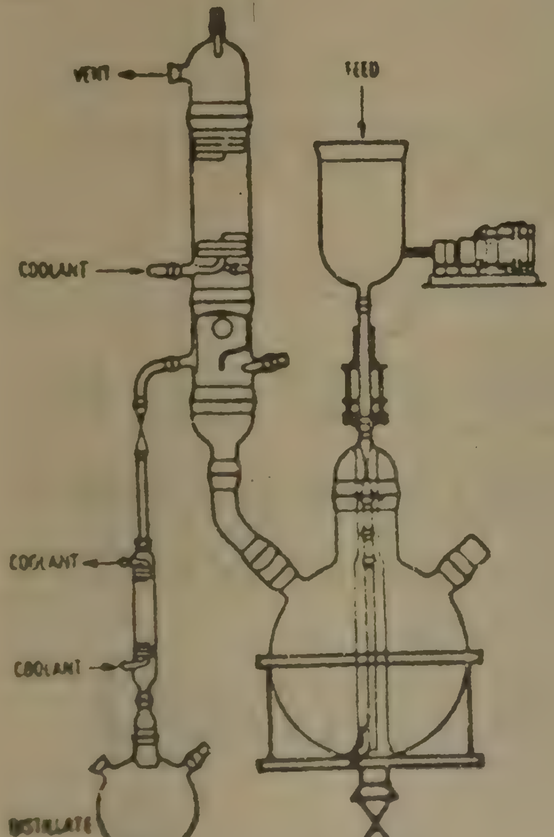

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Food and Pharmaceutical Technology in Perspective

BIG MARKET FOR FLAVOURS, FRAGRANCES, NATURAL COLOURS & SPICE EXTRACTS FROM INDIA

There is a tremendous market for Indian natural flavours, fragrances, natural colours and spice extracts in the Western developing countries, reports Mr. John Dean, an international expert in this field. According to Dean there is a geat potential for the development of natural spices and plants in India for the export of their essences and fragrances. There is at present a great craze for natural products and India should take advantage of this craze.

From the Indian context, what seems to be most attractive is the processing of spices, oleoresins, natural colours and essential oils, since India is one of the largest spice exporters. Use of supercritical carbon dioxide to extract oleoresins/essential oils and colours from spices can become a stepping stone for India in the field of supercritical extraction technology.

Supercritical CO_2 can be used to extract flavour components of spices to give spice extracts with natural composition with no solvent residue. Spices like pepper, chilli, nutmeg, etc., have been tried for supercritical extraction (*Food Technol*, 24, 1282 (1970); *J. Fleischwirtschaft*, 63, 1747 (1983). Advantages from this type of extraction are: (a) greater uniformity of the product, (b) gives product free from microbial contamination and (c) high yield with higher quality obtained.

Supercritical fluid extraction also is of immense value in the extraction of natural colouring substances. Paprika presents an interesting challenge in this direction. The use of paprika oleoresin as a natural colouring agent in food is greatly hampered due to the presence of 'capcisine' which gives a hot, burning taste. Removal of capscisine from oleoresin requires temperature, which in turn reduces its colour value. However, the two stage extraction of dried paprika powder by supercritical CO_2 allows selective extraction and effective separation of capscisine from red colouring matter, giving good natural colour free from hot principles (*Gordian* 83, 164 (1983)). In this manner, the method yields two high valued products: (a) hot principle to be used as flavouring extract, (b) good natural colouring matter and (c) high protein residue, a low value product, useful as an animal feed.

MEAT ROBOT UNDER TEST IN THE UK

A robot that can drive a powered knife through the rot section of a beef carcass and then follow the trajectory of the bone to separate the meat, has been successfully tested at Bristol University (UK).

The prototype has been developed as part of a research programme to produce an 'intelligent' meat industry robot guided by artificial vision and other sensors. It is the result of a collaborative project between Bristol University's research group and the Institute of Food Research in Bristol. Initially, the robot will concentrate on industrial meat cutting which is highly labour intensive and requires skilled labour. (*Food Manuf.* 4/1989, p. 9).

EFFECT OF GAMMA RADIATION ON VITAMINS

Radiolysis of vitamins on sterilization by gamma irradiation has been reported in several publications. Gamma sterilization of vitamins in dry formulations results in no decomposition, which is why this is particularly recommended for lyophilisates. It is also possible, in a few cases, to use gamma rays to sterilize the vitamin solution without losses: there were no changes in the molecular structure of retinyl palmitate in oily solutions at a radiation dose of 5 Mrad = 50 KGy (*Pharm Ind.* 49, 212-216 (1987)). Likewise, there were virtually no losses from 20% aqueous calcium pantothenate solutions. However, reduction of the calcium pantothenate concentration to 1% resulted in extensive (70%) radiolysis (*Khim Farm Zh.* 17, 462-466 (1983). (*Vandemecum In Vitamin Formulation By Volker Buhley Wossenschaftliche) (Valagagessalschaft mbH, Stuttgart* 1988 p.p. 111-112).

DATA ON EGG CHOLESTEROL CONTENT CHALLENGED BY HPLC

Eggs are generally assumed to be high in cholesterol and people at risk to heart attack are warned to be cautious in their intake. However, researchers recently have shown that the date should be re-evaluated. Current data were obtained by calorimetric determinations and are too high by a factor of 30%. Using high performance liquid chromatography (HPLC), the researchers found 10.97 mg. of cholesterol per gm. of wet yolk compared with figure of 13.86 mg. obtained by a calorimetric method of saponified egg yolk. (*J. Agric, Food Chem*, 1989, Vol. 97, 917-20).

EXPLOSIVE GROWTH IN AQUACULTURE SPAWNS NEW MARKET FOR AQUACULTUE FEEDS

Aquaculture — the production of aquatic animals in a controlled environment — is increasing as US consumers eat more fish and importers are unable to keep up with demand. As reported by US Dept. of Agriculture, aquaculture is one of the nation's fastest growing agriculture industries. Consequently, new markets for meals, fats and oils are being created to provide aquaculture feeds.

In 1986, the US aquaculture industry produced more than 600 million pounds of catfish, crawfish (also called crayfish), salmon and other aquatic products, compared with 200 million pounds in 1980. The US aquaculture production currently is estimated at more than 790 million pounds, valued at approximately $ 700 million, and is expected to surpass 2 billion pounds by 2000 A.D. Almost 90% of the US aquacultural production is concentrated in 4 major species -- catfish, crayfish, salmon and trout.

Global aquaculture production totaled about 22 billion pounds in 1986. Currently, 102 species of fin-fish, 32 species of crustaceans, 42 species of mollusks and uncounted numbers of miscellaneous species are cultured worldwide. Industry sources predict that by 2010 AD, aquaculture will account for 25% of the worldwide aquatic harvest.

Meals, fats and oils and other oilseed by-products provide protein, essential nutrients and fatty acids in fish and crustacean feeds. Aquaculture's profitability is closely related to the world supply and the cost of feed requires high protein feeds and feeds are usually the largest variable cost item in commercial production.

Fish are fed higher percentages of protein in their diets than land animals beause fish have lower energy requirements. Commercially fomulated fish feeds contains 25-45% crude protein. Consequently, high protein feedstuffs such as fish meal, animal by products and oilseed meals make up 60% or more of the ingredient composition of the formula.

Fish meal conventionally is used in the diets of farm raised fish worldwide, but high cost and limited supplied have encouraged the use of other meal sources, particularly soyabean meal in shrimp and cat fish meal.

Because plant proteins cost less than animal proteins, concentrated sources of plant protein should be used as much as possible in fish feeds. Considering quality, cost and world availability, soyabean protein will probably be the key ingredient in aquaculture feeds. Similarly, in future, cottonseed meals will also be used in aquaculture feeds.

Research is under way in the USA studying the amount of cottonseed meal that can be used to the optimum level in the acquaculture feeds. The only drawback is that cottonseed meal does not have a sufficiently high level of lysine. However, this problem may be solved by adding synthetic lysine.

Aquaculture feeds require less carbohydrates because fish have a lower dietary energy requirement than land animals, because fish don't have to maintain a constant body temperature and because they exert less energy to maintain their position or move in water. Also, they excrete most of their nitrogen as ammonia instead of urea or uric acid. Dietary fats costs more than carbohydrates, therefore, aquaculture feeds will be relatively costly. Therefore, research and economic study are essential for producing aquaculture feed at the lowest possible price.

Worldwide cultured shrimp production has increased considerably in recent years. China is a world leader in cultured shrimp production. Other major producers of cultured shrimp are Taiwan, Indonesia, India and Thailand. Shrimp production in South East Asia has reached an all time high and may be on the verge of explosive growth. Therfore, there is a good market for fish feed for shrimps in India as well as in South East Asia. Because fish meal is quite costly, soybean protein's use as a supplement in feed is seen as an economical feedstuff in the shrimp industry in Asia. (*JAOCS* 11/1989, pp. 1531-38).

FISH MEAL AUGMENTS MILK FROM DAIRY COWS

USDA researchers in USA have shown that giving a high protein seafood supplement could increase the milk production efficiency. Researchers reported a two week feeding studies conducted on 20 Holstein cows, at the US Dairy Forage Centre in Madison (Wisconsin). Tests showed cows gave 4% more milk as compared to their milk yield on solvent extracted soybean meal.

Zapate Haynie Corp., an American company is going to market in 1990 a processed fish meal for dairy cows based on the above finding. (*JAOCS* 11/1989, p. 1557).

PUREST FORM OF EICOSAPENTAENOIC ACID (EPA) AND DECOSAHEXAENOIC ACID (DHA) PRODUCED BY REVERSE PHASE HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

The National Oceanic & Atmospheric Administration's (NOAA), National Marine Fisheries Service (NMFS) of USA has successfully separated purified fractions of omega-3 fatty acids from refined Menhadin oil using reverse phase high-performance liquid chromatography.

Two of the omega-3 fatty acids present in fish oil eicosapentaenoic (EPA) and docasapentaenoic acid (DHA) acids are the focus of concentrated research by the medical community for their purported beneficial effects in the prevention of cardiovascular diseases.

The new technology will provide the research community with pure EPA and pure DHA for research and experiment under an agreement between the NOAA and the National Institutes of Health in USA.

The report 'Purification of Omega-3-fatty acids from fish oils using HPLC', appears in Proceedings of the 12th Annual Conference of the Tropical & Sub-tropical Fisheries Technology in June 1988 p. 74.

For more information, contact NOAA ORTA Suitland Professional Centre (SPC), Rm 307, Suitland, Maryland, 20233, USA. (*JAOCS* 11/1989, p. 1559).

IMPACT OF MOLECULAR BIOLOLY & GENETIC ENGINEERING ON MODERN MEDICINE & PHARMACEUTICAL SCIENCE

Of the technical and scientific influences at work to which the medicine of our age is exposed, molecular biology and its offspring genetic engineering, are of paramount importance. The impact is still relatively modest. Recombinant human insulin and human growth hormone, recombinant tissue plasminogen activators and interferon do of course exist and monoclonal antibodies have won a secure place in medical diagnostics. Nevertheless, medicine would not look much different without these acheivements than with them.

The picture changes, however, if molecular biology and medicine are considered in a historical perspective. The first experiments with r-DNA took place in the mid 1970s, and the year 1975 also marked the beginning of monoclonal antibody (MAB) techniques. These scientific and technical breakthrough decisive for their impact on therapy and diagnosis, are now 15 years old.

If one bears in mind that the development of a new drug today takes 8 to 10 years from the initial experiments to the conclusion of clinical development, it is astonishing that the drug armamentarium of modern medicine already includes such a large number of recombinant substances. For example, today there as many as 41 recombinant proteins in clinical trials the world over as reported in the December 1989 issue of Drug News & Perspectives (page 455).

What are the implications for medicine in its encounter with molecular biology and genetic engineering? There will be two sides to this question in future: one will affect the practice of medicine, therapy and diagnostics; the other medical research, in particular pharmaceutical research. (*DN & p.* 12/1989, p. 454).

A NEW PROCESS MAKES BONES EDIBLE TO PROVIDE GOOD NUTRITION

A unique process to soften cattle, pig and chicken bones so that they are tender enough to eat has been developed at the Toyame Prefecture Food Research Institute (Toyama Japan). First, acetic acid is used to dissolve calcium carbonte, the hardening agent in bones, then it is neutralized by a caustic solution.

Japanese researchers report that a pig's rib is as tender as pork after it has been soaked in acid for about 20 mins. Meat balls made of 80% meat and 20% softened bone have no unusual taste or texture, softened bones may be added to hamburgers, sausage or cookies to improve nutrition -- pig bones contain up to 1000 times as much calcium, phosphorus and iron as pork. Some food companies are already negotiating commercial agreement and the first product is expected to be on the market in 1990. (*Chem. Engg.* 1.1.90, p.p. 25-27).

A NEW YELLOW COLORANT FOR FOOD CONTACT PLASTICS APPROVED IN USA

A new yellow colorant for plastics developed by Ampacet Corp. (USA) has been recently approved by FDA in USA for food contact plastics. According to the company, the new colorant exhibits the same opacity and colour values as lead chromate colorants, which do not have FDA approval for food contact. The new yellow colorant has been developed for the blown and cast film industries. (*CMR.*, 1/15/90, p. 29).

A NEW BIODEGRADABLE PLASTIC BASED ENTIRELY ON STARCH DEVELOPED

The US pharmaceutical and consumer products company, Warner Lambert, has recently developed a biodegradable plastic based entirely on starch. The company expects to market this starch-based plastic called NOVON for plastic converters in the coming 2 to 3 years.

Researchers at Warner Lambert discovered the plastic, while looking for a new starch material to replace the gelatin used in drug capsules. Under temperature and pressure, they discovered a starch polymer that could be molded or extruded.

Plastics based on petrochemicals have been criticized for the long-term waste problem they represent. Packaging has been developed containing a small percentage of starch to enhance biodegradability. In addition, plastics based on starch are beneficial as they are based on annually renewable feedstocks.(*Chem Wk.*, 1/31/90, p. 67).

A PATENT ON SYNTHETIC FOOD TO CONTROL OVEREATING & LEVEL OF BLOOD GLUCOSE

A Japanese company, Terumo Kabushiki Kaisha, has filed a European Patent (no 323,510) on a synthetic food which it claims can prevent overeating and help diabetics to control the level of glucose in their blood.

Mechanical extension of the stomach inhibits appetite. Medical methods of extending the stomach wall, for instance by inflating a balloon in the stomach or stapling the walls require surgery and may have unpleasant side effects. Their answer is to provide a foodstuff that stays in the stomach for a long time and fills the space.

This is normally difficult because acidic juices in the stomach reduce the viscosity of food. The new material is a mix of water-soluble fibre, such as carrageen or guar gum, with protein, such as sodium or calcium casseinate. This mixture forms a gel in the stomach which absorbs water and some of the sugar in food and drink eaten subsequently. The sugar is thus prevented from passing through the stomach wall and into the blood and the gel stops the patient from feeling hungry.

The company claims that glucose levies in the blood of diabetics were lower when they ate the gel before dining. (*New. Sci.*, 1/27/90, p. 39).

AN ORAL TYPHOID VACCINE APPROVED BY FDA IN USA

Food & Drug Administration (FDA) in USA has approved recently an oral typhoid vaccine with significantly fewer side effects than the currently available injectable vaccines. The new product called typhoid vaccine live oral typhoid Ty21a -- is a live bacteria vaccine in a coated capsule. It was developed and is made by the Swiss Serum & Vaccine Institute in Berne, Switzerland and will be distributed by Berne Products Corporation, Coral Gables, Florida (USA).

Typhoid is rare in USA, but the vaccine will be important to tourists, business people and the military travelling to remote, less developed areas where sanitation is poor. The majority of the annual 400 to 500 cases of typhoid reported in the USA every year have been contracted in the other countries.

The US Health & Human Services secretary, Mr. James Mason, reported that clinical trials of the vaccine involving more than half a million children and adults were carried out in Egypt, Chile, Indonesia, Switzerland and the USA. "In most efficacy studies", he reports, "the oral vaccine was shown to be comparable to that previously reported for injectable typhoid vaccines without the severe side effects, such as fever, which can temporarily incapacitate many recipients of the injected vaccine.

The new vaccines is prepared by growing Salmonella typhy -- the bacteria that cause typhoid fever -- in a nutrient medium. The bacteria are collected by centrifugation, dried and put in gelatin capsules. The capsule is taken orally, one capsule on each alternate day, for a total of 4 capsules. A booster dose every 4 years is recommended if the exposure to typhoid is continuous or repeated. (*CMR*, 1/15/90, p. 7).

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Science Briefs

COST OF SLOWING DOWN GLOBAL WARMING: A HIGH PRICE EITHER WAY

The chairman of President Bush's council of economic advisers, Michael Boskin, told reporters that a bid to slow down global warming could cost the US alone $200 billion a year. His comments came in the context of the White House conference on global changes convened by President Bush.

Both the US and Japan are expected, during the meetings, to emphasise the potentially staggering costs of reducing greenhouse gas emissions while the futurists and environmentalists are expected to argue that no cost is too great to control global warming and that the consequences of inaction could be disastrous to humanity as a whole and in fact to all life on this planet.

White House science adviser Allan Bromley says the earth has warmed about 0.5 degree celsius but it is not clear to him how much of that rise in due to human activity. Mr. Boskin, one of the three co-chairmen of the conference, played down the significance of the potential heating. He said that a rise of a few degrees celsius would be similar to the change from moving from Boston to Washington, and might even benefit US agriculture.

Those who fear the cost of inaction include David Rind, a climate specialist at the US government's Goodard institute of space studies. He said that his computer models predict a rise of between 2 and 6 degrees celsius if the amount of carbon dioxide in the atmosphere doubles, as expected, in the next century.

Even a rise of two degrees would, he said, increase droughts in Florida and the southernmost parts of the US, Central America and large parts of Africa and South America. Four-degree rise would be a "disaster" leading to droughts in most of the US. In other words, the cost of inaction, according to him, would be much more than the $200 billion a year which makes Boskin flinch.

Mr. Boskin said cutting emissions 20 per cent by the year 2005, as suggested by countries in Western Europe, would cost the US "billions of dollars" — $100 to $200 billion a year "would be in the ballpark". "It would", he warned, "mean a period of substantially higher unemployment and lower economic growth because the US would have to switch to much more expensive forms of energy."

Even stabilising carbon dioxide emissions would deal a big blow to the economy, Boskin said. The last time US emissions of the gas didn't grow was when the Arab oil embargo quadrupled the cost of oil and the economy plummeted.

William Nordhaus, a Yale University economist who was in the council of economic advisers in the Carter administration, contended that Boskin was exaggerating the costs. According to Nordhaus, the cost of stabilising greenhouse gas emissions overall during the next 40 years would only be $50 billion a year for the US and $150 billion annually for the rest of the world.

Slowing the increase of greenhouse so that they grow at a rate 20 per cent less than predicted would cost little, he asserted. It might even have benefits economically, according to him. Nerves are frayed on both sides on the eve of the conference. Environmentalists charge that President Bush is playing down the impact of what they see as the coming disaster. There are also problems between the developed and developing countries. Some developing countries say that if the world is doomed, it is because of uncontrolled development in the developed countries.

It is of no use asking the developing countries not to develop in order to protect the environment, they say. According to them, the bulk of the cost of saving the world from disaster must be met by developed countries.

MAGNET PLASTIC

A Japanese laboratory has produced a plastic that exhibits magnetic properties at low temperatures. This breakthrough could greatly affect technologies such as magnetic sensors. Previous attempts to make magnetic plastics could not produce a uniform material of consistent quality, but the group at the University of Hokkaido in northern Japan is using a process that avoids many of these difficulties.

The team, led by Masaaki Tabata, made the material by dissolving a derivative of acetylene in ethanol and reacting it in the presence of a rhodium catalyst for 24 hours. A yellow precipitate was produced which, when heated to 200°C, transformed into a plastic material of uniform characteristic. The material is nonmagnetic at room temperature, but at temperatures lower than -180°C it shows magnetic properties. This is just above the temperature of liquid nitrogen.

VITAL BREAKTHROUGH IN THIN-LAYER SUPERCONDUCTORS

Researchers in the Netherlands have succeeded in obtaining a usable vapour of barium compound, a step which signifies a major step forward in the production of thin layers of new ceramic superconductors. For the new range of materials being produced in recent years for low power applications, thin layers on appropriate substrates are being developed at a high rate. The most interesting new compounds all contain copper oxide, calcium oxide, strontium oxide or barium oxide in combination of these oxides.

The Metal Organic Chemical Vapour Deposition (MO-CVD) process is usually employed for industrial production of thin layers, for example, for electronic components like ICs (chips). In this process metal organic compound of each metal is vapourised by heating. The gases are then directed to the substrate to be coated, where they are decomposed by further heating. The mixture of metal compounds such as oxides is then converted in situ to the desired compound, in this case a superconductor.

These chain molecules are highly flexible which makes them preeminently suitable for filling the holes in the screen surrounding the complex. The result is a strong increase in the volatility of organic barium and a constant mass transport into the gas as a temperature below 150°C. Similar effects have been achieved with calcium and strontium.

-- **The Hindu**

THREE NEW ISOMERS OF BENZENE

Three new molecules each with the chemical formula of benzene but a different arrangement of atoms have been made in Texas. This brings the total number of forms, or isomers, of benzene to seven. More importantly, it completes the set of all possible isomers with the chemical formula C_6H_6.

Benzene is the only stable arrangement of six carbon atoms and six hydrogen atoms. In this molecule, single bonds alternate with double bonds. Although chemists have known its structure for more than a century, benzene was "photographed" only comparatively recently. In 1988, scientists at IBM's Almaden Research Center in San Jose, California, used a scanning tunneling microscope to show conclusively that benzene's six carbon atoms are arranged in a ring.

Michael Faraday discovered benzene 165 years ago in cylinders that had held acetylene gas. It was later named by August Kekule, who proposed its structure in 1865. He claimed that the idea came to him one summer evening as he dozed on a Clapham omnibus, but this claim is now being disputed.

In 1867, James Dewar proposed a second structure, which was proved in 1963 when his molecule was finally made. Chemists have also proposed other structures, such as benzvalene, which was isolated in 1967, and prismane, which was prepared in 1973. The only remaining isomers of C_6H_6 that were possible were the double-ring systems known as bicyclopropenyls. There are three isomers: 1,1; 1,2; and 2,2. They differ only in the positions of their double bonds.

Now, Wilbur Billups and Michael Haley of Rice University in Houston have made the 2,2 and 1,2 isomers of bicyclopropenyl. They also claim to have made the 1,1 version, but give no details. To identify the new isomer, Billups and Haley used nuclear magnetic spectroscopy. In this technique, scientists use a turned magnetic field to identify the six hydrogen atoms by the spin of their nuclei.

Bicyclopropenyl (2,2) is stable only below 10°C; above this temperature, it slowly decomposes to a yellow solid, as yet unidentified. Billups and Haley were surprised by this, because they expected it to revert to benzene itself. They calculated that this would release a remarkable 500 kilojoules per mole of energy.

-- **The Hindu**

GLASS RECYCLING

Siemens AG in West Germany has developed a standard plant for producing new bottles from old glass. The technique saves raw material and energy. However the degree of purity must be increased to make use of even older glass during melting. The remains of bottle caps or aluminium, lead or zinc foils could so far only be sorted out by complex methods, which also caused a high loss of glass.

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Siemens in Frankfurt/Main has now come up with a plant, which removes up to 90 per cent of unwanted metals and registers a glass loss of less than one per cent. In this ELPAC plant (Electro Pneumatic Aluminium Concentrator), the crushed glass passes over a chute, beneath which there are detectors, which register even the smallest particles of metal. A jet of compressed air emerges from a nozzle, at exactly the right moment, in order to eject the piece of metal into a container. The plant can treat 10 to 15 tonnes of old glass an hour.

-- The Hindu

PHENOLIC COMPATIBLE GLASS REINFORCEMENTS

The reinforced plastics (RP) industry in India is a little over two decades old. After a sluggish start in the initial phase, a stage has now been reached wherein the RP industry has been having a sustained annual growth rate of 16-17% during the past five years. There are several contributing factors to this increased growth rate — greater awareness by the user industry on the advantages of RP, switchover to alternate materials with a view to preserving dwindling timber resources, generation of new applications in RP which were hitherto unexplored and lastly, the development of new grades of thermosetting polyester and (recently) phenolic resins and also glass fibre reinforcements.

For most of the new applications developed in RP, especially in the field of rail transport and building/construction, the requirements of fire retardance/low smoke emission are being stressed by the end user. While fire retardant polyester resins are freely available in India, toxicity hazards and economics have become a deterrent factor. This has led to the emergence of phenolic RP which has the advantage of high COI and low smoke emission apart from higher temperature resistance.

Contact moulding favoured

Contact moulding is still the most popular form of RP processing. Since conventional chopped strand mat (CSM) and woven roving (WR) used with unsaturated polyesters cannot be used with phenolics, the R & D Centre of Ceat Tyres took up the development of special grades of CSM and WR suitable for use with phenolic resin. As the mechanism of cure/cross linking of the resin is different from polyesters, a change in binder formulation during manufacture of the glass fibres was necessitated.

With the development of special grades of glass fibre reinforcements suitable for contact moulding, phenolic RP has begun to find increasing uses in many applications, especially where superior heat resistance and fire retardance (which cannot normally be met with the fire retardant polyesters) are required. Following this success story, the Research and Development Centre is now working on the development of suitable grades of glass fibre rovings for use with phenolic resins in filament winding and SMC

-- The Hindu

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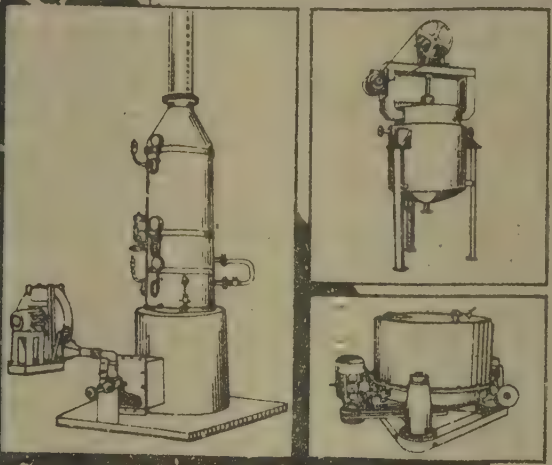

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Importance of monitoring effluent from metal finishing industries and the role of ion selective electrodes

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Introduction

Rapid industrialisation in every country has resulted in significant pollution of atmospheric air and environmental waters. This has exposed the 'fauna and flora' on the earth to various health hazards necessitating the evolution of safety standards and their enforcement. The uncontrolled discharge of wastes — solid, liquid and gases — from the industries is largely responsible for the pollution. Hence the industries have been advised to adopt the following steps progressively; (i) the wastes should be treated to a harmless state before discharge; (ii) the technology should be improved so as to minimise the levels of discharge and ultimately to approach a 'zero-discharge state'.

Pollution control and electrochemical techniques

Pollution control measures need as a first step precise analysis and estimation of the pollutant levels. In this context, electrochemical methods play a useful role because of their characteristics such as: (i) high sensitivity; (ii) selectivity; and (iii) adaptability to on-line monitoring. A variety of electrochemical techniques are available for trace analysis. Voltammetry, polarography and ion-selective electrodes are a few of them. These methods enable species to be monitored at ppm - ppb - sub ppb levels. Among them, ion-selective electrodes (ISE) deserve an unique place owing to the singular fact that it is a very simple, easily portable gadget that can measure species at ppm-ppb levels of concentration and can facilitate field determinations. The functioning of ISE's is based on the fact that when these electrodes are dipped in a solution containing the ions to which the ISE is sensitive, a stable equilibrium potential is attained. The magnitude of the potential so established, is related to the concentration of the ions in solution, through Nernst-type equation, viz.

$$E = E^\circ + \frac{RT}{nF} \ln C_i$$

The main advantage of ISE technique is that, even though other ions are present in the solution along with the ion of interest, concentration determinations can be carried out accurately based on its selective response to the desired ion. This characteristic of ISE enables it to be a highly suitable technique for pollution monitoring.

Pollution due to electroplating industries

Industrial metal finishing operations which involve both organic and inorganic coatings, contribute pollution of both water and air and require close attention in respect of monitoring. The organic finishing industries contribute mostly to the pollution of air, because of the use of volatile organic solvents and surface cleaning procedures like sand blasting. Attempts to mitigate this evil has led to the development of more and more water-borne systems. On the contrary, the inorganic finishing industries constituted mostly by electroplating installations, tend to pollute through toxic cations and anions let out in their waste discharges. Additionally, the surface pretreatment procedures such as pickling also play a role in water pollution.

The nature of pollutants and their levels normally present in effluents from metal finishing industries (1) (Table 1) criteria for public water supplies and the maximum tolerable limits of the different pollutants in the effluent after treatment are in Tables 2 and 3 (2, 3). It is obvious from the tables that the levels encountered are low, necessitating the employment of sensitive methods of analysis, preferably instrumental to make them adaptable for on-line approaches.

The use of ISEs in such contexts enables rapid analysis (30 to 40 analyses in one hour) at trace and ultra trace levels. Applications of ISEs to metal finishing industries have been periodically reviewed (3-5). The present communication presents a review on the recent applications of ISE in monitoring of electroplating effluents and also electroplating baths. Besides, an attempt has been made to critically review some of the recent developments in measurements with ISE.

Table 1
Composition of raw waste streams

Waste constituents (1)	Concentration (ppm) (2)
From common metals plating	
Copper	0.032- 272.5
Nickel	0.019- 295.4
Chromium, total	0.088- 525.9
Chromium, hexavalent	0.005- 334.5
Zinc	0.112- 252.0
Cyanide, total	0.005- 150.0
Fluoride	0.002- 141.7
Cadmium	0.007- 21.6
Lead	0.663- 25.39
Iron	0.410-1482
Tin	0.060- 103.4

(1)	(2)
From precious metal plating	
Silver	0.050- 176.4
Gold	0.013- 24.89
Cyanide, total	0.005- 9.970
Palladium	0.038- 2.207

Effluent analysis

Cations

The toxic metal cations often encountered in the effluents from metal plating industries are Cr (VI), Cd (II), Cu (II) and Zn (II). Suitable ISE's have been successfully employed for monitoring these species.

The Cr (VI) is highly toxic. Even though there are no solid state ISEs, for monitoring Cr (VI), liquid membrane type electrodes based on hexadecyl triphenyl phosphonium salt (6, 7) and triheptyl dodecyl ammonium iodide (8) have been developed. The electrodes are found to give Nernstian response in the range of 60 mM to 2 uM and detect down to 5 x 10^{-7} M and have been successfully applied to the analysis of waste water chromium and zinc electroplating facilities. A comparison (7) of the results obtained by hexadecyl triphenyl phosphonium based ICE with these obtained through spectrophotometry shows excellent agreement between the two results. Further, continuous ionometric determination of Cr (VI) in electroplating waste waters through flow systems have been reported (9). The successful development of this electrode is a boon as Cr (VI) species is one of the worst pollutants. It would have many applications in tannery wastes.

Estimation of Cu (II) in electroplating waste waters have been achieved (10) through the use of solid state cupric ISEs which exhibited Nernstian response from 0.1 uM to 10 mM of Cu (II). Another significant improvement has been the development of flow injection analysis with a coated tubular solid state Cu (II) selective electrode (11), covering a working range upto 5000 ppm with a detection limit of 0.5 ppm. This system besides approaching a sample frequency of 80/hour encounters interference from foreign metal ions to a lesser degree than that in batch analysis. Successful application of cadmium ISEs to waste waters from metal plating industries have been described (12). Though one does not come across applications of ISE for analysis of Zn (II) in metal finishing waste waters, there is ample scope for analysing Zn (II) in effluents either by direct/indirect methods (13-15).

Anions

Monitoring of pollutant anions in effluents very often relates to cyanide and hydroxyl ions. The analysis of the latter is taken care of by pH measurements carried out through pH electrodes which form a class of ISEs. The monitoring of cyanide has been achieved through the use of cyanide ISE (16, 17) or hydrogen cyanide gas sensing probe (18). The waste water from plating installations is acidified with tartaric acid (to pH 4), heated to 50° ± 1°C for 5 minutes and adjusted to pH 12, without distillation and then estimated with a CN^- have been estimated with a CN^- ISE (16) 0.05-100 ppm concentrations of CN^- have been estimated accurately. Further, estimation of cyanide — free and complex form —in metal finishing effluents (obtained by suitable dilution of the copper, zinc, cadmium cyanide plating baths) at ppb levels have been achieved using cyanide ISE in differential potentiometric titration mode (19).

In another procedure (17), waste water sample is acidified with H_2SO_4 and kept overnight in a sealed microdiffusion apparatus. The HCN developed is absorbed in NaOH solution which was subsequently analysed with a CN^- ISE. Investigations (20) on the influence of the presence of cations like Zn (II), Cd (II) and Cu (II) and OH^- anions on the response of CN^- ISE have enlarged the scope of the application of CN^- ISE despite the presence of serious interference. The hydrogen cyanide gas sensing probe (18) is reported to have a detection range of 10 nM to 0.5 uM CN^-. It can be seen that the tolerable limits of cyanide fall within this range and hence ISE procedure can be conveniently employed for monitoring of CN^-, which otherwise requires rather tedious and involved procedures. Besides CN^-, potentiometric determination of nitrates (21) using ISEs has also been described.

Plating bath analysis

The concentration levels that have to be estimated during analysis of electroplating baths are no doubt much higher than those encountered during the analysis of effluents. Nevertheless, the use of ISEs under such conditions does make the analysis simpler and quicker. Introduction of on-line systems with ISEs may facilitate continuous monitoring of the bath constituents.

The determination of cupric ion concentration in copper plating solution (22) has been carried out using cupric ISEs, by prior dilution of the bath sample. Estimation of gold and silver in the respective electroplating solutions have been successfully carried out using ISEs (23-30). Liquid membrane type electrodes based on dicyano argenate and dicyano aurate anions have been developed. $Au(CN)_2^-$ electrode with tetraphenyl arsonium (26) as ion exchanger has been used in the determination of gold in electroplating solution. Again gold in electroplating baths in the form of $Au(CN)_2^-$ has been estimated by potentiometric titration with crystal violet picrate (27). Interestingly with the help of $Au(CN)_2^-$ electrode, the concentration of Au^+ and Au^{3+} in gold plating electrolytes have been precisely estimated (26).

Table 2
Criteria for public water supplies

Waste constituents	Permissible Concentration (ppm)
Copper	1.00
Cyanide	0.01
Iron	0.3
Cadmium	0.01
Nickel	0.8
Sulphate	250.0
Zinc	5.0
Hexavalent chromium	0.05
Lead	0.05
Silver	0.05
Palladium	7.0

Table 3
Tolerance limits after the treatment of toxic effluents IS 2490 - 1974

pH	5.5 to 9.0
Cyanide	0.2 ppm
Cadmium	2.0 ppm
Chromium, hexavalent	0.1 ppm
Copper	3.0 ppm
Nickel	3.0 ppm
Zinc	5.0 ppm
Lead	0.1 ppm

Similarly, silver has been determined using liquid membrane electrodes based in $Ag(CN)_2^-$ with a suitable ion exchanger. Tetradecyl phosphonium (28), and trinonyl octadecyl ammonium (30) have been employed as suitable ion exchange materials. The main advantages of silver estimation through ISE over the argentometric titration procedure is that the time-consuming and potentially hazardous need to destroy CN^- in the latter method is not there. Consequently, the ISE method provides a faster and simpler procedure. Comparison of the results obtained for the analysis of silver in real and synthetic plating baths has clearly shown (29) that the data resulting from ISE method agree excellently with those obtained from argentometric procedure. Apart from this, ISE procedures for estimating zinc in zinc plating baths (13, 14, 15), nickel in cyanide cadmium plating solutions (31), palladium in electroplating compositions (32, 33), fluoride in lead plating solutions (35, 36), nitrate in palladium electroplating baths (37, 38), chloride in various electroplating baths containing chloride as major or trace constituent (38), cyanide in zinc cyanide plating solution (38), saccharin in nickel plating solution (39) CTAB in zinc and copper plating solutions (40), H_2SiF_6 in glass polishing baths (41) and aluminium in anodising baths (38) have been reported.

Future perspectives

Catalytic kinetic analysis

An interesting developments in ISEs is that they can be used as indicator electrodes for monitoring various reactions catalysed by trace amounts of elements. By this method trace amounts of elements for which no direct ISE exists, can be precisely estimated. For example, Mn (II) is known to catalyse the reaction between periodate and formaldehyde. By using a periodate electrode based on $HTOA\text{-}IO_4^-$, the Mn (II) content of some natural water samples (42) was estimated to be in the range of 48-920 nM. These values agree very well with those obtained from spectrophotometric determination. Similarly, determination (43) of molybdenum (VI) in the range of 0.1-160 uM has been achieved by using its catalytic effect on the oxidation of iodide to iodine by hydrogen peroxide in acidic medium.

An iodide ISE was employed in this determination. Determination (44) of Au (III) in the range of 50 nM to 5 uM has been carried out by monitoring the concentration of CN^- produced during the Au (III)-catalysed reaction between potassium ferricyanide and EDTA, with the help of a cyanide ISE. Estimation of trace amounts of metals like Cr (VI), V (IV), V (V), Fe (III) and Zr (IV) based on catalytic kinetic analysis have been reported (43). This development holds a lot of promise for the future of ISE so that pollutant species for which direct ISEs are not available can be monitored through judicious choice of a suitable reaction system and an appropriate ISE.

Cells in series

Another interesting development (45) is claimed to improve the sensitivity of the ISEs many times in potentiometric determinations. In this technique, potential measurements are carried out on a number of electrochemical cells (consisting of an ISE and an suitable reference electrode) that are linked in series, instead of measuring on a single cell. Such an arrangement will enhance the ΔE values at equivalent point by many times as many number of cells are in series.

Analysis of sub-Nernstian response

With a view to enhance the sensitivity limits of ISEs, attempts have been made to elicit more information from the experimental data obtained in the sub-Nernstian response region. The parameters responsible for the non-linear behaviour in this sub-Nernstian region have been discussed in detail (46). A non-linear pattern matching procedure (47) with the help of a mini computer, has been suggested for utilising the data in the sub-Nernstian range. By this procedure, bromide in the concentration range of 5-24 ppm and thiocyanate in the range of 8 to 26 ppb have been determined. Further attempts made in this direction, viz., exploitation of sub-Nernstian response data will surely enhance the utility value of ISEs.

Multi component analysis

ISEs can also be viewed as non-specific sensors, since they respond in varying degrees to other ions rather than specifically to a single ion. In situations where interferents are present, the natural way would be to develop more and more specific electrodes. Interestingly, an alternative way to overcome such interferences would be to calibrate the ISEs with respect to all ions that interfere with the determination of the primary ions (48, 49).

Conductance measurements

Another interesting development consists of measuring the conductance rather than the potentials across the ISE. This mode of measurement is claimed to overcome the two genetic limitations of normal ISE measurements viz., (i) need for reference electrodes which are usually associated with liquid junction potentials and (ii) response to activities rather than concentrations. Bipolar pulse conductance (50) measurements have been applied to ISEs (51, 52). Though this method is stated to have good promise, its analytical utility needs to be probed further.

Flow analysis

Analytical measurements in flowing liquids (53) are primarily used in situations such as continuous monitoring industrial process streams and environmental pollutants. For analysis of large numbers of similar samples, flow methods are sometimes economically more advantageous than batch measurements. Electroanalytical techniques, because of their response signal being electrical in nature, are easily amenable to automation and hence they can advantageously be employed as detectors in flow analysis.

ISEs, which form a class of potentiometric sensors, find extensive use in both segmented flow analysis (SFA) and flow injection analysis (FIA) and also for continuous monitoring of waters. Measurements with ISEs are not affected by the original sample colour and the presence of small amounts of precipitates. Moreover, it provides non-destructive type measurements. A small sample is separated from the stream, treated if necessary and measurements made. This procedure ensures stability of the ISE. pH, K^+, Na^+, Ca^{++}, F^- are the ISEs widely employed in flow analysis.

Taking CN^- ISE as the model, the dependence of the electrode signal on the experimental parameters for industrial flow analysis involving flow injection technique and continuous monitoring has been well discussed (54). Flow injection analysis permits a throughput of upto 120 samples/hour, with measurement over a fluoride concentration range of 0.3-10 ppm (55). FIA detection limits for halides ISEs are reported (55) to be in ppb range. Cyanide in the range of 0.2 to 100 ppm and sample throughput rate of 40 per hour have been monitored in the process streams of treated plating wastes (56, 57).

The dynamic characteristics of an ISE are of relevance to their application to flow analysis. Solid membrane ISEs are generally more suitable for flow measurements, because of their moderately fast response, better mechanical properties and longer life times. It will prove more advantageous if ISEs replaced by ISFETS which are rugged and have a small active surface area (0.008 mm^2). Their response is rapid, they have a low electrical resistance and permit multi-ion determination as several ion-selective membranes can be housed in a single sensor. Miniaturisation of the whole assembly can be achieved.

Conclusion

ISEs play a significant role in metal finishing industrial operations — effluent and plating bath analysis. The analysis of many of the toxic ions can competently be tackled with the help of ISEs. Better versions of the electrodes can bring several other ions also into the fold of ISE analysis in future. Flow analysis with ISE as sensors can be expected to gain firm grounds because of its high sample throughputs and easy adaptability to automation and continuous monitoring. Improved monitoring capabilities are expected to be evolved through methodologies such as electrode array, electrode-series approach, processing of non-linear response, computer adaptation and on-line processing of the effluent streams.

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On choosing chemicals to manufacture in SSI sector

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With the considerable encouragement given by the Central and State Governments, there has been a boom in the growth of small scale industrial units in the country in the recent years. While this is a welcome phenomenon, the performance of several of the SSI units have not been satisfactory. A number of them have become sick and closed down, making some wonder as to whether basic flaws exist in the concept of SSI sector itself. Such doubts have been raised particularly with regard to the chemical projects in the SSI sector.

If one would carefully analyse the causes for sickness in SSI chemical units, it would become evident that an important reason has been due to the wrong choice of the product for manufacture itself. In SSI sector, it is very important that the product chosen for the manufacture should have relevance to the background, qualification and experience of the promoter. This is particularly so, since the promoter has to combine within himself competence in various spheres of activities and attend, by himself, different portfolios like production, maintenance, purchase, marketing etc., unlike in the case of medium and large scale units, where specialists can be appointed to look after different functions individually. It is nearly impossible for any individual promoting SSI unit to be a specialist in various fields, to avoid excessive dependence on outside agencies. SSI units cannot also afford to employ specialists in various fields, due to their inability to offer them adequate compensation and growth opportunities in the organisation. This factor has to be kept in mind while deciding the choice of product for manufacture, which should be such that the SSI entrepreneur should be able to manage independently.

It is high time that the Government and the financial institutions should evolve certain guidelines for the choice of products for SSI units and relate it to the promoter's background. They should avoid providing assistance to the SSI units, simply on the basis of the capability of the promoter to bring the margin money. Such guidelines for chemical industries in SSI sector have become very important, since the various factors contributing to the overall performance of chemical industries are becoming increasingly complicated, with the greater advances made in the field of technology, process control measures and competition in the market in terms of techniques and approach.

In the choice of chemical product to manufacture, the technology factor certainly becomes the most important consideration. If the entrepreneurs were not to be the persons with technical background, they should then opt for only such products that involve comparatively simple and widely available technology, involving not more than two or three stages of production and unit operations. They should ensure that they would not excessively and operation of the project. The SSI entrepreneurs should all the time be conscious of the fact that they would not be able to afford big expenditure or the time for carrying out R & D measures and trouble shooting operations, in the event of teething problems in commissioning the plant and stabilising the process operations to achieve optimum cost and quality levels. Hiring technical talents in specialist areas to overcome the problems will become a formidable task for the SSI units, while facing technical constraints. In view of such possibilities, it would always be better and safer for non-technical entrepreneurs to choose products that have simple process technologies for manufacture and those that are readily available.

There are a number of chemical projects exclusively reserved for SSI sector by the Government of India. But, the SSI entrepreneurs would find that this factor, by itself, cannot be of significant help to the SSI units in many cases. A number of such products reserved for SSI sector like phthalate plasticisers and copper/zinc sulphates etc. are really manufactured by a number of big industrial groups, who disguise themselves as small scale sector by floating separate companies, for the purpose of satisfying the Governmental regulations. Such units, backed by big groups, have tremendous advantages over the 'honest SSI units', particularly in overcoming teething problems, providing credit sale for the products in the market and even in hiring talents. A number of cases can be pointed out, where highly paid technologists work in SSI sector backed by big groups, though the SSI sectors by themselves will not be able to afford the type of salaries demanded by senior and specialist technologists.

Further, reservation for SSI sector are only guided by the level of investment in the fixed assets, but have nothing to do with the annual turnover of the units. A number of units exist in the SSI sector, who have annual turnovers exceeding as much as Rs. 30 crores, which obviously mean that such units need very high level of working capital funds, that should really be beyond the capability of 'honest SSI units'. The reservation of the products for manufacture in SSI sector by Government need not necessarily be an advantageous point for the choice of decision on the product to be manufactured by the SSI entrepreneur.

Quite a number of small scale chemical projects find themselves in a situation of working capital inadequacy, due to the high level of prevailing credit periods, that they have to provide for selling the products and also the bad debts, to some extent. Such situations arise only due to the inadequate survey of the market mechanism and demand supply situation for the products, before launching the project by the entrepreneurs. When adequate working capital funds are not provided for the project before commencement of production operations, a situation of fall in production and consequent loss in the undertakings would invariably take place. The scheduled banks generally show lethargic attitude and lack of understanding in coming to the aid of small scale units in times of need in quick time and such an attitude on the part of the banks must be kept in mind by the SSI entrepreneurs, while working out their working capital strategies. Such problems can be solved by doing a little bit of advance planning and thinking, taking note of the ground realities and facts and figures. Under any circumstances, SSI units should avoid borrowing from private sources at high interest rates that would upset the original profitability estimations of the project.

It is generally well known that intermediaries, traders and distributors hold tremendous control over the market forces for the chemical products, particularly those produced by SSI units. Such intermediaries generally are known to make more profits than the SSI units themselves.Atleast half the problems of SSI chemical units in marketing the products are related to the transactions with the distributors and dealers. SSI units are exploited in both ways, while purchasing the raw materials as well as while selling the finished products. Some amount of intimate knowledge of such market forces are absolutely important for the SSI entrepreneurs; apart from such knowledge, the SSI entrepreneur should also satisfy himself about his capabilities to deal with such market forces for the products proposed to be manufactured.

It would be ideal that the chemical products chosen for manufacture in SSI units should have a large market base, instead of catering to the requirements of one or two industries or consumer sectors. This is essential to ensure that they would not be at the mercy of anyone or be subjected to 'big brother attitude' by large scale units, who would not hesitate to twist the arms of SSI units in times of difficulties or when it would suit them. It often happens that the large units change their production programmes or product formulations depending upon their own requirements, when there would be no considerations at all for the plight of the SSI units mainly dependent upon them for the country's long term industrial and economic growth pattern should receive greater weightage in the choice of chemicals to manufacture in SSI units, rather than the short term advantages like the favourable Government policies or ancillary status to large units.

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News From Japan

MAJOR STEELMAKER TO SET UP DRUG SALES COMPANY IN JAPAN

NKK Corp., one of the world's top-5 steelmakers, will set up a wholly owned subsidiary for R & D on and marketing of therapeutic products in the coming fiscal year. The company tied up last year with a Japanese drug company — Sanwa Kagaku Kenkyusho Co. — for joint development of three drugs including an agent for treatment of angina pectoris.

They will seek manufacturing approval for the agent within this year at the earliest and approval may be granted in 1991 or 1992. NKK intends to strengthen its commitment to R & D and commercialization of biotechnology-applied drugs.

Although a growing number of Japanese businesses has been branching out into the drug field year by year, it is rare for a company advancing into this field to form a drug sales firm so shortly after the start of its involvement in this arena.

SAIDEN CHEMICAL TO START FULL-SCALE EMULSION ADHESIVE PRODUCTION IN N. AMERICA

Saiden Chemical Industry Co., a comprehensive manufacturer of adhesives, will start an enterprise on a full scale in the North American market in April this year. According to its plan, it will push the production and sale of adhesives, with Halltech Inc. (Head Office: Toronto, Ontario), the 2nd-biggest manufacturer of adhesives in Canada which it purchased towards last year-end, as a base. It will supply emulsion adhesives mainly to automobile, electrical machinery and paper manufacturers.

For the present it will push its undertaking with Japanese capital-affiliated enterprises as targets. In future however, it will sell its products to Canadian and U.S. enterprises as well, by such steps as to make use of the free-trade agreement between the United States and Canada. Also, exports to North America will be replaced completely by production in North America.

In the case of emulsion adhesives, exports account for about 4 per cent of the total sales. Along with the progress of overseas production by automobile and electrical machinery manufacturers who are the main customers, it has been requested that necessary countermeasures be taken.

Also, Saiden Chemical Industry had planned to advance into the North American market long ago, and started a related market survey several years ago. In March last year it created the Overseas Enterprise Department to start full-scale preparations for overseas development. Towards the end of last year it purchased Halltech to establish a foothold for overseas development.

Halltech managers continue to run the company purchased by Saiden Chemical Industry. Three officials, including a technician and an official to handle financial affairs, have been sent from Saiden Chemical Industry. It is said that adjustment of production lines is going on at present, with the starting of full-scale operation in April this year as a goal.

From now on Saiden Chemical Industry will realize complete overseas production by making the fullest use of the functions of its new overseas bases, and push the exploitation of the North American market.

POLYSTYRENE-COMPOUND PRODUCTION PLANNED FOR U.S.: NIPPON STEEL CHEM.

Nippon Steel Chemical Co. is scheduled to inaugurate in the United States commerical production of compound of flame-retardant polystyrene (trade name: Estyrene SE). The product will be supplied mainly to makers of household electrical appliances, particularly Japanese ones who have begun production activities in the States.

The company is pushing forward polypropylene-compound operations in the U.S. via Thermofil Inc., which it took over in March last year. Thermofil — the U.S.'s 4th-largest compound maker — has commercialized a wide variety of compounds including fiber-reinforced compound, high-performance polymer alloy and compound for molded foam and aerospace equipment. Its mainstay item is polypropylene compound for automotive parts.

U.S. demand for compound particularly for use in household electrical appliances is steadily growing along with advance of Japanese makers of household electrical appliances into the U.S.

Nippon Steel Chemical is considering handling in the States polystyrene compound on the basis of Thermofil's business activities.

JAPANESE TiO_2 TO BE SUPPLIED TO BIG-3 CAR MAKERS IN STATES

Tayca Corp. has announced that it will begin supplying its ultrafine titanium dioxide (TiO_2) to GM and Chrysler of the U.S., in addition to Ford. It started exporting the chemical to Ford last year and the product has since been attracting great attention from U.S. car makers, leading to the subsequent export agreements with the two former companies.

The Japanese company is turning out the product to full capacity at its Okayama factory and will soon start constructing an additional plant to meet growing demand.

The ultrafine titanium dioxide trademarked "MT Series" is used for metallic-body paints on cars. Compared with conventional titanium dioxide, it is extremely fine — averaging 10-50nm in particle diameter. This improves the permeability of visible light and prevents passage of ultraviolet rays, which serve to make brighter the colors of the pigments of the paints applied. Coatings using this titanium dioxide produce a variety of colors depending on the angle of reflection.

Ford has adopted MT series for its 1990 Lincoln in three colors (deep and light blues, and gold). Chrysler and GM have not reportedly decided on the models to which the new product will be applied.

MT Series capacity in Okayama is said to be not less than 20 t/m and the company is said to be planning to double capacity within this year.

APPLICATION APPROVAL FOR ARTIFICIAL RED CORPUSCLES SOUGHT IN EC

The Green Cross Corp., has called on W. German, British and Spanish authorities to approve use of inhouse-developed artificial red blood cells (trade name: Fluosol) as a cardioprotective agent for percutaneous transluminal coronary angioplasty.

Fluosol contains a perfluorochemical product as a main ingredient and performs an important function in carrying oxygen.

Application of the product to the same purpose was authorized by the U.S. Food and Drug Administration (FDA) on December 26 last year via the company's U.S. subsidiary — Alpha Therapeutic Corpn. The US company has established subsidiaries in W. Germany and the UK and invested in a Spanish firm. Green Cross intends to obtain the application approvals through these subsidiary companies.

In a related development, the Japanese company envisages expanding application of Fluosol to a cardioprotective agent for acute myocardial infarction and an intensifier for radiotherapy for cancer treatment. Fluosol's oxygen-carrying function is expected to activate cancer in a deep part of the body, thereby enhancing the efficiency of radiotherapy.

The company claims that Fluosol improves the efficacy of anticancer agents — BCNU and AUND — when used in combination with them. It intends to step up related research.

CATALYSTS & CHEMICALS INDUSTRIES TO DOUBLE FCC CATALYST PRODUCTION

Catalysts & Chemicals Industries Co., has started twofold expansion of FCC catalyst production at its Wakamatsu Plant (Kitakyushu City, Fukuoka Prefecture). With the introduction of new technology and new production processes, annual production there will be increased to 24,000 tons by July to supply catalysts of high quality and functions in accordance with the demands of customers. This expansion step also aims at regaining domestic market share which has been decreasing recently due to the increasing inflow of imports, and at expanding exports, especially those of Southeast Asia. For these purposes, the company will begin to strengthen its business department covering both domestic and overseas activities, in accordance with the expansion of its supply to products. All these efforts are predicated on the medium-term management plan which the company is currently pushing. It will tackle this plan as part of its business expansion, with its capacity to develop technology in the background.

At present Catalysts & Chemicals is pushing a 5-year medium-term management plan to be completed in 1992. On the basis of the technology it has developed by catalyst production for more than 30 years, the company aims at developing a wide range of catalyst enterprises, covering FCC, desulfurization and denitration catalysts, advancing into new fields of activity by means of high-function fine products, centered on silica ultradust, and building new enterprises. Its goal is to record sales amounting to ¥20 billion and regular profits amounting to ¥2 billion in 1992, which is the last year of the present 5-year plan.

The twofold expansion of FCC catalyst production, too, is a part of the efforts in this direction. The Wakamatsu Plant of this company has an annual production capacity of 12,000 tons. The company will introduce new production processes while making use of the existing production lines. By July it will establish a system for annual production of 24,000 tons.

Domestic demand for FCC catalysts is increasing, along with the increase in gasoline consumption. During the past several years, the offensive from overseas manufacturers has been intensifying. As a result, the domestic market share of Catalysts & Chemicals, whose share had been about 70% until several years ago, has decreased to 50%.

In view of such a situation, the company aims at regaining its domestic market share by means of reduction of production costs through two-fold expansion of FCC-catalyst production. It will also strengthen its capacity to develop high-function catalysts in accordance with users' recent demands for cracking of bottom oil, in an effort to secure new customers.

CAPACITY BUILD-UP PLANS FOR POLYPROPYLENE WORKED OUT

Japanese polypropylene (PP) makers plan to scale up their production capacities by a toal of 520,000 tons a year by the end of 1992. They have already established four cooperative marketing companies and intend to make capital investment in rotation or set up new joint firms in a bid to build up the said production capacity.

Production expansion plans for polypropylene (in t/y)

1989	
Tonen Sekiyu Kagaku	60,000
Ukishima Polypropylene	80,000
Mitsui Toatsu	30%
Mitsui Petrochemical	30%
Nippon Petrochemicals	30%
Mitsui Nisseki Polymers	10%
1990	
Chiba Polypropylene	60,000 (spring)
Sumitomo Chemical	47.5%
Ube Industries	31.7%
Tokuyama Soda	15.8%
Union Polymer	5%
Yokkaichi Polypropylene	40,000 (midyear)
Tosoh	47.5%
Chisso	47.5%
Union Polymer	5%
1991	
Asahi Chemical	40,000 (Jan.)
Mitsubishi Kasei/Mitsubishi Petrochemical (Mizushima)	50,000 (mid year)
Idemitsu Petrochemical	50,000 (Sept.)
1992	
Mitsubishi Kasei/Mitsubishi Petrochemical (Kashima)	80,000 (mid year)
Showa Denko (Oita)	80,000 (mid year)
Total	**520,000**

As shown in the table, the parent companies of Mitsui Nisseki Polymers Co. are scheduled to jointly establish Ukishima Polypropylene and the two groups of parent companies of Union Polymer are also due to establish two joint companies, Chiba Polypropylene and Yokkaichi Polypropylene. Owners of Dia Polymer will set up a joint company.

Four parent companies of Ace Polymer have decided to invest in PP production facilities in rotation. They have decided on independent plant-and-equipment investment since they have introduced most of their vapor-phase processes from overseas companies, many of whom have been opposed to establishment of joint companies by their licencees.

Demand for PP-copolymer grade for automotive use in particular—is growing rapidly both at home and abroad and capacity build-up has been planned in S. Korea, the States and Europe. There is, therefore, a fear that the planned capital investment in PP production in Japan will result in oversupply of the product. PP plants now under consideration in Japan are all middle-sized (80,000 t/y at largest). It seems that such middle sized PP plants will not ensure sufficient international competitiveness PP business is projected to be in a slump in Japan in 1992 and competition among domestic PP makers for larger market shares and procurement of raw material will be futher intensified from now on.

MELAMINE PRODUCTION REACHED NEW HIGH OF 99,000 t. IN 1989

Melamine production last year rose to a new high of 99,000 tons, increasing 4.1% in comparison with the preceding year. Domestic demand, too, increased to the highest level since 1973, because uses for paints and smoothly planned boards recorded double-digit increases, reflecting the boom in the automobile and building industries. Furthermore, exports, going mainly to such countries as Indonesia and Australia, scaled a new high of about 34,000 tons.

Domestic demand for melamine throughout last year amounted to 67,700 tons, increasing 9.4% over the figure for the preceding year. Of the amount concerned, 55% was used for adhesives. because melamine imports decreased by half, production of adhesives by means of the use of indigenous melamine increased. As a result, the use of melamine for adhesives increased by 8% in comparison with the preceding year. Formerly, about 5,000 tons of melamine were imported from Taiwan and East Europe (Rumania, Poland) every year. However, Taiwan has lost its export capacity because of its brisk domestic demand. Imports from East Europe have decreased, too, because East European products flowed into the Soviet Union due to the occurrence of a disastrous earthquake in Armenia the year before last. It is supposed that total imports last year decreased by half, or to about 2,500 tons.

As for domestic demand, paints use, which is supported by brisk automobile production, and use for smoothly planed boards, which reflects the building boom, increased by more than 10%, to buttress the expansion of domestic demand. As a result, domestic demand last year rose to the 2nd-highest level since 1973, when it amounted to 72,000 tons.

On the other hand, exports, too, rose to a new high, exceeding the preceding year's record of 31,900 tons by 2,000 tons. The reason is that countries rich in lumber resources, such as Indonesia and Australia, switched from export of lumber to that of plywood to raise added value and conserve resources. So, this switch over has its background in the increase in the demand for melamine as raw material for adhesives to be used for plywood.

In Japan, at present, melamine manufacturers are limited to Nissan Chemical Industries, Mitsui Toatsu Chemicals, and Mitsubishi Petrochemical. These three combined have an annual production capacity of 102,00 tons. They are already under full ope- ration, with operation rates as high as 97%. However, all these companie maintain a cautious attitude towar expansion of production facilities because adhesives use, the leadin factor in domestic demand, cannot b expected to increase, at this time when plywood imports are increasing.

UNITIKA TO EXPAND META-ARAMID FIBER/PULP CAPACITY TO 1,000 t/y

Unitika Ltd., plans to expand its "Apeil" meta-aramid fiber capacity to nearly 1,000 t/y at its Okazaki factory within three years, following another plan to double "Apeil" capcity there to around 500 t/y. The latter plan will soon be carried out. Apeil has excellent non-combustibility with an LOI (limiting oxygen index) of 30-32 and can be used for a long time on 200°C level. The company is now operating a 250-t/y plant (fiber: 150t/y; pulp: 100 t/y) for the product at Okazaki and its market cultivation has been proceeding satisfactorily. The current capacity will be raised to around 500 t/y by the end of this year,

The latest expansion plan indicates the company's good prospects for the product, particularly its anticipation that Apeil demand will grow further for use as insulating material for capacitors for the Tokaido and Tohoku Shinkansen Lines, as heat-resistant filter (bag filter) and laundry nets, and flame-resistant apparel material as well as car and aircraft parts.

This plan is also intended to catch up with larger-scale operations of aramid fibers by two major precursors—Du Pont Japan and Teijin—operating plants of 1,000-2,000 t/y capacity.

Unitika plans to start operating an 800-1000 t/y plant with the 1992 business year with the ratio of fiber and pulp being 6:4. When the plant is put into operation, the company will explore markets for use as long fiber to strengthen composite materials as well as aramid film. The former usefield will be that of aircraft parts and the latter, a substitute for the conventional pulp-based insulators of capacitors.

ASAHI CHEMICAL TO BUILD FLUOROCARBON RUBBER PLANT

Asahi Chemical Industry Co. Ltd., will go into full-scale production of fluorocarbon rubber. The company will construct a fluorocarbon-rubber production plant at the medical fctory of its Nobeoka branch (Miyazaki Prefecture) with completion scheduled for August this year. The investment involved has not been revealed.

Fluorocarbon rubber is a special synthetic rubber excellent in thermal, oil and chemical resistance and used for the important preservation parts of automobiles, etc. The company has been developing markets for the rubber since 1986 and the prospects for successful industrialization has become good. The company has therefore decided to construct the plant.

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New Developments From Japan

SNOW BRAND MILK WILL COMMENCE JOINT CLINICAL TESTS ON EPO

Snow Brand Milk Products Co., will implement joint clinical development or erythropoietine (EPO), a blood-production stimulating factor, together with Fuso Pharmaceutical Industries, Ltd. The former has been conducting clinical testing of its self-developed EPO since last March as an agent for treatment of renal anemia.

The company developed high-purity EPO for the first time in the world and has been marketing it as a clinical reagent. However, it has fallen behind other companies in clinical development of EPO as a therapeutic agent.

In Japan, a Kirin Beer/Sankyo group, Chugai Pharmaeutical Co., and a Toyobo/Hoechst group began EPO clinical testing ahead of Snow Brand Milk, which is preparing to build a setup for mass production as it has established a low-cost manufacturing method and developed an EPO shot preparation.

Its production method is based on gene-modified cell cultivation ensuring continuous production of high-purity EPO. It is said to have these advantages: (1) it is almost free from contamination; (2) labor saving is possible; (3) production facilities can be made compact; and (4) EPO-producing cells can be used for a long time. The processes adopted by the three other parties are not of the continuous type. Snow Brand Milk and Fuso are scheduled to enter phase-II clinical testing on EPO this March at five medical institutions in the Kanto district. They hope the tests will reach the phase-III stage in the spring of next year.

AGENCY ANNOUNCES NEW 'PLASTIC CERAMIC'

The development of a new fine ceramic material with plasticity that will enable it to be applied to new uses in automobile engine parts was announced by the governmental Agency of Industrial Science and Technology.

The announcement said the new ceramic has great plasticity and that at very high temperatures it stretches like elastic.

The ceramic, made from nitrate and carbonic silicon, has been jointly developed by the agency's Nagoya laboratory in collaboration with Mitsubishi Gas Chemical Co. The agency is affiliated with the Ministry of International Trade and Industry.

The nitrate and carbonic silicon were mixed in a ratio of eight-to-two, the announcement said. It said the new non-oxide ceramic is the first such material developed in the world.

The new ceramic has great resistance against heat and abrasion and thus may be applied to a wide range of uses, the announcement said.

It is also easier to process than conventional fine ceramics, which are very hard to work on, the agency said. Researchers found that the basic raw material of the new ceramic, when heated, hardened into crystals less than one micron in size—about one-10th the size of conventional fine ceramic crystals—the announcement said.

When heated to 1,600 degrees celcius, the crystal could be stretched to more than 2.5 times its original size.

JOINT VENTURE FOR FINE POWDER OF CERAMICS KICKED OFF

An inauguration meeting for Admatechs Corp. was recently held in a Tokyo hotel and M. Ogawa, manager of Toyota Motor Corporation's R&D Office, was named president of the new company.

The company has decided to build a manufacturing plant for high-quality fine powder of oxide-type ceramics on the site of Shin-Etsu Chemical's Naoetsu factory in Niigata Prefecture. The plant will come on line this fall.

The company is owned 55% by Toyota Motor, 25% by Shin-Etsu Chemical and 20% by Shinetsu Quartz. The three parent companies agreed on establishment of the joint venture last December.

The joint company is scheduled to produce fine particles (0.01-10 microns) of oxide-type ceramics using a new synthesis process developed by Toyota Motor. This process is capable of producing metallic oxide by incinerating metal powder within an oxygen flow. The company plans to market the said fine powder in the form of ceramic parts including IC-packaging material as a mainstay item and packing material.

Toyota Motor inaugurated last April a new system for collecting ideas about new business operations from among its employees. The planned venture will be the first of such ideas to be materialized.

KANEKA PLANS NEW EUROPEAN PLANT FOR ANTIBIOTIC INTERMEDIATE

Kanegafuchi Chemical Industry Co., Ltd. (Kaneka), headquartered in Osaka, Japan is planning to have a production plant in Europe of PHPG (D-p-Hydroxyphenylglycine, an important intermediate of the semi-synthetic penicillin, Amoxicillin). Kaneka already has an European subsidiary company called Kaneka Belgium.

Europe is currently the largest market for PHPG, and the demand for Amoxicillin is growing world-wide, especially in semi-industrialized and developing countries. Amoxicillin is recently included in Essential Drug List of the

World Health Organization (WHO). Kaneka Singapore Co., (Pte) Ltd., a wholly owned Kaneka subsidiary is the dominant supplier of PHPG. The construction of PHPG plant in Europe signals a commitment by Kaneka to remain a reliable supplier of PHPG in the global market. To keep production costs to a minimum, the European plant will use an immobilized enzyme system in combination with a state of the art automated process.

BETTER ANTITHROMBOTIC, SMALL-DIA. VESSEL DEVELOPED BY KANEGAFUCHI

Kanegafuchi Chemical Industry Co. has developed a segmented polyurethane-made blood vessel having a good antithrombotic property, together with both Research Center for Advanced Science and Technology, University of Tokyo, and National Cardiovascular Center.

The new vessel features small diameters (3mm or less), better antithrombotic property and higher flexibility than those of conventional polyurethane and "Goretex" used ones. The company will continue research to improve its affinity to endothelium and its flexibility.

The new vessel is based on segmented polyurethane with polydimethyl siloxane added to the main chain. It has fine pores of 8-11 microns in diameter with the combined area of the pores holding 45-50% of the cross-sectional area and it is reinforced by polyester mesh.

In-vitro tests show that the vessel is less active than conventional polyurethane-based ones in terms of every vital response concerned such as whole-blood clotting, coagulation, and complement and platelet reactions. In animal tests, 19 new vessels 7 cm. in length and 3mm. or less in inner diameter and 10 Goretex ones were applied to (implanted in) the carotid arteries for comparison.

Observing during a 135-day period on average, 10 out of the 19 new vessels remained open, while all the Goretex ones clogged. All obstructions of the new vessels took place at the parts where the artificial vessel and the animal one was connected.

MANUFACTURING APPROVAL SOUGHT FOR WORLD'S 1ST ANTI-AUTISM AGENT

Suntory Ltd. applied last year-end for manufacturing approval for its anti-autism agent, the first of its kind in the world. This brings the number of Suntory's inhouse-developed ethical drugs — for which it has sought manufacturing approval in Japan — to three. The anti-autism agent coded "SUN 0588" was developed in 1980 and has been undergoing clinical testing at medical institutions of the Ministry of Health and Welfare. It has proved effective for treatment of autism for the first time in the world, attracting great attention from those concerned throughout the world. Its common name is R-Tetrahydro biopterin.

The company is planning to build up a new setup for undertaking its drug sales that may start next year. The leading alcoholic and soft drinks make began R & D for therapeutic products for diversification in 1979. Two other drugs it developed earlier are gamma-interferon ("SUN 4800") applicable to skin cancer and an anti-arrhythmic agent ("SUN 1165"). Manufacturing technology for the former has been licensed to Schering Plough Corp. of the U.S.

2-DIMENSIONALLY ORIENTED CARBON MEMBRANE PIONEERED: RESEARCH GROUP

A research group at College of Engineering, Kyushu University has succeeded in developing a 2-dimensionally oriented carbon membrane having high strength (48.4 MPa) and high elasticity (193.0 GPa): the new product consists of hexagonal graphite planes, all of which are oriented in parallel with the membrane's surface.

The membrane is produced from inexpensive mesophase pitch with a high yield ratio for carbon. It is obtained through hydrogenation and thermal treatment (roughly 340°C) of the mesophase pitch: the membrane thereby produced is then turned non-fusible by treating it for 20 hrs at 270°C — a temperature lower than the softening point of pitch — and, as a follow-up step, undergoes carbonisation treatment at 1500°C. The resultant membrane consists of 1 cm-wide, 10 micron-thick layers incorporating hexagonal graphite planes.

Layered graphite compounds consisting of carbon fibre have excellent electrical/magnetic properties due to the characteristic arrangement of the electrons within the carbon fiber concerned.

Due to their high stability in air and high specific strength, they are regarded as promising magnetic and lightweight/high-conductivity materials. When the new membrane is transformed into film, it will attain these excellent properties at higher levels.

A similar 2D-oriented carbon membrane was one experimentally produced by incorporating carbon into polyimide but the research group is the first to directly produce the said new carbon membrane from carbon (mesophase pitch).

Employment of inexpensive mesophase pitch having a high yield ratio for carbon has paved the way for putting the new product into practical use.

Chemical News from Abroad

HOECHST BULLISH IN SPAIN

Hoechst plans to invest Pta 19.1 billion ($176 million) to boost its Spanish activities between 1990-92. The company is also poised to announce new acquisitions and is undertaking a major regrouping of its activities there.

Chemicals subsidiary Tarragona Quimica SA (Taqsa) is modifying its joint venture polypropylene (PP) plant with Repsol to produce copolymer grade PP. The Tarragona plant currently makes only homopolymer grades. Taqsa is putting up 50% of the Pta 1.2 billion investment. Overall spending by Taqsa over the two-year period will total Pta 5.38 billion. Also at Tarragona, Messer Griesheim is investing in a Pta 5 billion industrial gases plant.

Vianova, Disper and Herberts are spending a total of Pta 1.4 billion over the two year period in safety and environment and restructuring measures. In addition, Herberts will increase paints production capacity by 2,000 m.t. to 12,000 m.t./year at its Barcelona facility.

The West German chemicals major is seeking government approval to restructure its Spanish plastics and resins businesses, and the company's pharmaceuticals operations under the Hoechst Iberica umbrella. The companies involved are Taqsa, Vianova Iberica and Instituto Behring.

According to the company, the move is a "functional reorganisation" aimed at improving efficiency and boosting Hoechst's presence in Spain. In 1989, sales were Pta 93.13 billion ($859 million), 7.3% up on the previous year. Downward pressure on polyolefins prices, which make up a third of the group's sales in Spain, led to a 28% slump in net income to Pta 54.4 billion. Sales of chemical intermediates were ahead 16% while turnover in the paints sector rose nearly 11%. Overall exports climbed 19.1% to Pta 11.73 billion.

SHOWA INVESTS

Showa Denko has announced plans to invest $1.34 billion at its Ohita, Japan complex. The company is to begin construction on a 500,000 m.t./year ethylene cracker in 1993 for start up two years later on land adjacent to its existing site.

It also intends to add 130,000 m.t./year capacity to its existing 600,000 m.t./year facility at Ohita later this year, but expects demand to increase sufficiently to go ahead with the new $334 million unit. The balance of the investment at Ohita will be for the production of ethylene derivatives over the next ten years.

TRUSTS TO BREAK UP

Czechoslovakia's umbrella organisations for chemical enterprises in Slovakia and Bohemia are likely to be dissolved under new legislation being prepared in Prague. Chemopetrol, which manages enterprises in the Czech republic, and Solvchemia of the Slovak republic, could soon disappear.

"It is expected that factories under Chemopetrol will take independent status" confirmed Vaclav Volf, general director of the foreign trading oranisation, Chemapol. With political change in Czechoslovakia has also come speculation that executives associated with the former government will be removed — possibly many at Petrimex, another trade organisation. But both Volf and Rudolf Stencl, head of Petromex, are said to be confirmed in their positions.

R-P TO SHED PVC ASSETS?

Rhone-Poulenc is actively seeking to divest its Spanish PVC assets, operated by wholly-owned subsidiary Rio Rodano, sources in Madrid say. One possibility is the transfer to fellow French firm Atochem as part of the gov-

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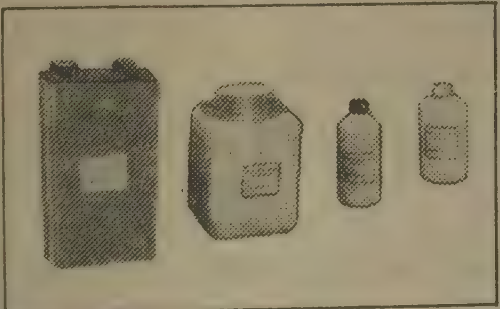

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ernment's wide-ranging restructuring plans.

But the Atochem deal is just one possibility being examined. It is understood that talks are also being held with Japanese and German firms and that such a transaction would be a better deal for Rhone-Poulenc. PVC growth outlook for south European markets is above average for Western Europe as a whole.

Neither Atochem nor Rhone-Poulenc would comment. However, such a transaction would both fulfill Atochem's ambitions in the region and fit with Rhone-Poulenc's stated strategy to divest businesses in which it did not have a strong position. Rio Rodano accounts for around half of Rhone-Poulenc's sales in Spain of some $900 million/year.

The Spanish PVC operation comprises Rhone-Poulenc's only interests in the bulk plastics sector. Production is split between two sites in Spain: at Hernani in the north, and a larger facility at Miranda del Ebro in the south. Total output is around 100,000 m.t./year, representing some 30% of the Spanish market. Rio Rodano also includes downstream businesses Cica and Sevinil; and its VCM joint venture with Solvay, Viniclor.

A source at Atochem said that even if the company acquired Rio Rodano, it would still go ahead with plans for a new PVC unit in Spain. This would make sense as the Rio Rodano plants are old and Atochem may want to replace them with new capacity.

ASSETS SWAP

In the US, an agreement has been reached on an exchange of assets between Ausimont NV, a subsidiary of Italy's Montedison, and Atochem North America, wholly owned by France's Atochem. Under the deal, Ausimont is to acquire Atochem's Thorofare, New Jersey fluoro chemicals activities. Atochem had to sell the business, acquired last year as part of a wider deal with Pennwalt, under an antitrust ruling by the US FTC. The main output from the Thorofare plant is polyvinylidene fluoride (PVDF) used in architectural coatings as well as in the electronics and chemical process industries. According to Ausimont, the deal will reinforce its presence in the US where sales are currently around $120 million.

For its part, Atochem will receive Ausimont's organic peroxides business in Spinetta, Italy. Products are used in the polymerisation of high polymers, unsaturated polyesters and elastomers. Sales of the PVDF unit are put at FF310 million ($54 million) against FF200 million for the Ausimont facility. Atochem did not comment on reports that it is to receive a cash sum as part of the agreement, which requires approval from the relevant government authorities.

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News About New Projects

NORSK HYDRO IN KOLA, PVC JOINT VENTURE PLANS

Norsk Hydro is at an advanced stage of negotiations to form a phosphate production joint venture in the Soviet Union. The talks, with the PO Apatit entreprise in Kirovsk, centre on expansion of the Rasvumchorr mine near Kirovsk on the Kola peninsula.

Norsk Hydro, the world's largest producer of fertilisers, currently buys all its phosphate raw material requirements, including product from the Kola mines. The new venture, in which Hydro will have a minority, probably 49% share, will become the Norwegian company's first captive source of the raw material, meeting around 10% of the group's needs.

The company will support Apatit with hard currency, equipment and knowhow in expanding the mine by 30-50% from the current 1.5 million m.t./year of apatite concentrate. In return, Hydro will take about 200-300,000 m.t./year of concentrate. At present Hydro buys around 3 million m.t./year of phosphate rock from different sources, including Florida, Morocco, Israel and Jordan. Kola rock has been used in three Hydro NPK plants — the now closed unit at Embsen, West Germany, as well as Porsgrunn and Glomfjord in Norway. In the future, the raw material may also be used in the company's French and Dutch plants.

Kola apatite contains 39.4% P_2O_5 and is regarded as one of the world's best quality phosphate raw materials. Stocks have been declining, however, and the P_2O_5 content in the ore has dropped from 25-30% to 17%. Increasingly, large investments are required to maintain production at the current level of 20 million m.t./year.

Meanwhile, Hydro Polymers, a PVC producing division of Norsk Hydro, is also looking at investing in Eastern Europe, specifically in the Baltic region. The company would be interested in supplying VCM from its existing network to a PVC and downstream producing venture.

COURTAULDS IN MAJOR EXPANSION

Courtaulds, the world's fourth largest producer of carbon fibres, is expanding capacity to meet fast growing demand. Intensive debottlenecking of existing equipment will raise its current global capacity by over 40% from 850 m.t./year to 1,200 m.t./year within 18 months. This, says Geoff Marsh, chief executive of the Grafil division, will help the company keep in step with the 15%/year market growth. Present capacity is split between Courtauld's Coventry, UK and Sacramento, California, US plants. The carbon fibres business was formerly a joint venture with Dexter Corp.

Courtaulds, which pioneered commercial manufacture of the high performance material, says there is still growth left in the aerospace industry and, although military applications will probably decline, general industrial and automotive uses to replace metal, are increasing.

The UK company, currently being demerged into separate chemicals/materials and textiles groups, has 21% of the 7,000 m.t./year world market for carbon fibres. It ranks fourth after Toray, the world leader with 25-30% of the market, followed by Toho Rayon and Hercules.

Prices for carbon fibres have declined with the growth in volumes and the company forecasts a continued drop with the normal learning curve progression. Typical selling price is now £20-30/kg. The only other UK producer of carbon fibres is Manchester-based RK Textiles, which has a smaller operation than Courtaulds and also makes oxidised fibres.

LINDE LIKELY TO JOIN ASETCO

Asetco (Novyi Urengoi) Ltd., a proposed joint venture between John Brown of the UK and the Soviet concern Gazprom could have a new partner. Linde, the West Germany contractor expanding Asetco's Budyennovsk ethylene plant, is negotiating to build the 300,000 m.t./year ethane cracker at Novyi Urengoi. Lummus is no longer involved.

As this plant will be the most expensive part of the project, which also includes a 300,000 m.t./year polyethylene facility, Linde could be involved in raising part of the finance from Germany and could also become a shareholder. A tie-up between John Brown and Linde could strengthen the financial arm of the deal if the German contractor brought with it financial backing-perhaps from Deutsche Bank, Morgan Grenfell's parent, which is already working with John Brown.

LAB CAPACITY TO DOUBLE

Indonesia's only producer of linear alkyl benzene plans to double output under a licensing deal with UOP. Officials at PT Unggul Indah Corp said production will be 120,000 m.t./year by 1992. The royalty and engineering deal was signed with Nikki Universal of UOP. It gives the local company rights to use the technology at its Java plant.

The original plant was constructed in the mid-1980s by Mitsui & Co. and Chisso Engineering of Japan. Nearly all the Indonesian company's LAB is used domestically but company sources say they hope to expand exports with the increased output. Benzene raw material comes from Singapore but an aromatics plant being built by Pertamina and a foreign consortium should cut that reliance beginnin

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MARKET INFORMATION

Hydro Firms, Dimethylamine Down

Prices of hydro rose by Rs. 3 in the Bombay chemicals market due to a revision in price by a leading manufacturer. Ready availability of material led to fall in prices of dimethylamine, with good availability at Rs. 30 per kg. Polyvinyl alcohol (PVA-173) rose by Rs. 5 per kg with fall in supply of ready material. Prices of dye intermediates remained around last week's levels and trading was moderate.

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent – and, as such they are not FIRM PRICES as between a buyer and seller. The prices are published only with a view to giving some ideas of the market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

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Polyvinyl alcohol (No. 208)	150.00
Paraformaldehyde (Resale)	22.00
Phthalic anhydride 36% (Resale)	25.00
Pentaerythritol (Resale)	49.00
Paraffin wax	19+ST
Rangolite (German)	96+ST
Rangolite (Czech.)	73.00
Rangolite (China)	55.00
Sodium sulphate (Fine)	3.75
Sodium sulphate (Coarse)	3.50
Sodium sulphide 50-52% (Flakes)	11.50+ST
Sodium sulphide 58-60% (Flakes) (TCL)	25.00
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite (Resale) per 50 kg.	840.00
Sodium chlorite 80% (Spain)	98.00
Soda Ash (Tata)	4.90
Soda Ash (Birla)	4.30
Soda Ash (Imp.)	4.50
Sodium bicarbonate	7.00
Sodium bisulphite	8.00
Sodium silicate	5.50
Sodium acetate	7.20
Sodium alginate	450.00
Titanium Dioxide (Anatase)	78.00
Titanium Dioxide (Rutile – RCR$_2$)	92+ST
Tartaric acid	150.00
Trisodium phosphate	12.00
Thiourea	83.00
Urea (Tech.)	3.00
Vacuum salt	1.00
Zinc Dust	52.00
Zinc Oxide	57.00
Zinc chloride powder (Tech.)	20.50
Zinc sulphate	7.00

SOLVENTS	**Per Kg.**
Acetic Acid Glacial (Resale)	13.75
Acetic Anhydride (Resale)	36.50
Acetone (Resale)	17.00
Adipic Acid	90.00
Aceto Acetanilide	55.00
Aniline Oil	49.00
Benzoate Plasticiser	62.00
Butyl acrylate	80+ST
Butyl stearate	38.00
Butanol	34.00
Benzyl Alcohol	60.00
Benzyl Chloride	34.00
Benzo trichloride	16.00
Benzoyl chloride	22.00
Bromine Liquid	65.00
Chloroform	27.00
Carbon Tetrachloride	19.50
Cellosolve	58.00
Cyclohexanone	57.00
Cyclohexanol	58+ST
Diacetone (Resale)	27.50
Diethyl Oxalate	34.00
Diethyl glycol (DEG)	27+ST
Dioctyl Phthalate	44.00
Diallyl Phthalate	41.00
Dimethyl Phthalate	28.00
Dioctyl Adipate	52.00
Dibutyl Adipate	42.00
Dipentene	15.00
Dimethylamine 40%	30.00
Dimethylamine 50%	35.00
Ethyl Acetate	17.50
Ethyl Acrylate	72.00
Ethylene Dichloride	16.00
Ethylene Glycol	16.00
Formic Acid (Imp.)	23.00
Formaldehyde (Resale)	7.50
Glycerine (CP)	55.00
Glycerine (IW)	54.00
Hydrogen Peroxide 50% (Resale)	27.50
Isopropyl Alcohol	33.00
Isobutyl Alcohol (Resale)	35.00
Monoethanolamine (Resale)	90.00
Melamine	60.00
Methyl Ethyl Ketone	32.00
Methyl Isobutyl Ketone	42.00
Methyl Acrylate	66.00
Methylene Dichloride (Resale)	16.00

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Phone Nos.: 6407778/6424736 Gram: MULTIORG, Bombay-51
Telex: 011-74530 MOL IN

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Gram: GOHIL CHEM

Carbitol	64+ST
Meta Cresol	45.00
Nitrobenzene	19.00
Nitric Acid (Conc.) (RCF)	2.50
Ortho Cresol	30+ST
Phenol (Resale)	35.00
Propylene Glycol	50.00
Polyethylene Glycol (No.200)	58.00
Polyethylene Glycol (No.400)	65.00
Polyethylene Glycol (No.500)	52.00
Polyethylene Glycol (No.1600)	54.00
Polyethylene Glycol (No.4000)	80.00
Polyethylene Glycol (No.6000)	85.00
Para Cresol	110.00
Styrene Monomer	45.00
Sorbitol	14.00
Sulphuric Acid	2.80
Trichloroethylene	28.00
Triethanolamine (Resale)	88.00
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	20.00
Vinyl Acetate Monomer	52.00

SOLVENTS	Per Litre
Benzene	11.00
N-Heptane	10.50
N-Hexane	12.50
Methanol	9.00
Solvent Naphtha Heavy	10.50
Solvent Naphtha Light	8.50
Toluene	11.00
Xylene	22.00

DYES INTERMEDIATES (PRICES ARE WITHOUT TAX AND EXCISE)	
Alphanaphthylamine	65.00
Alpha Naphthol (Imp.)	165.00
Aceto Acetic Ester (Methyl)	70.00
Ammonium Molybdate	210.00
Anthraquinone	145.00
Anthranilic Acid	78.00
2-Amino 4-Nitrophenol	140.00
Blue B. Base (Local)	350.00
Beta Naphthol (Atul)	75.00
Benzidine Dihydrochloride (BDH)	92.00
Bromamine Acid	550.00
BON Acid (Incl. of excise)	124.00
Chicago Acid (Atul)	157.00
Coach Acid	52.00
C. Acid (Imp.)	210.00
Cyanuric Chloride	140.00
2,4- DNCB	27.00
Dihydrothio PTOS (Imp.)	1,000.00
Dimethyl Aniline	75.00
Diethyl Aniline	160.00
Diamino stilbene disulphonic acid	168.00
3,3-DCB (Imp.)	175.00
Gamma Acid (Atul)	205.00
H. Acid (Atul)	105.00
G. Salt	73.00
Isophthalic Acid	45.00
J. Acid	297+ST
J. Acid Urea	410.00
K. Acid	125.00
MPDS (German)	185.00
Meta Ureido Aniline	230 00
MPD (Local)	205 00
MPD (Japan)	240 00
Naphthenic Acid	25.00
N-Methyl J. Acid	400.00
N-Methyl Aniline	125.00
Naphthalene (Refined)	23.00
Ortho Anisidine (OA) (Imp.)	110.00
Ortho Dichloro Benzene (ODCB)	20.00
OT Base	125.00
Para Dichloro Benzene (PDCB)	32.00
Para Anisidine (PA local)	160.00
PNA	120.00
Para Cresidine (Imp.)	410.00
Para Amino Azo Benzene (India)	150.00
PNCB	55.00
Para Amino Acetanilide	190.00
1-Phenyl 3-Methyl 5-Pyrazolone	140.00
Phenyl J. Acid	340.00
Para Amino Benzoic Acid	165.00
PT Base	140.00
Rhoduline Acid	550.00
Resist Salt 80%	28.00
Resorcinol	210.00
Sodium Naphthionate	67.00
5-Sulpho-Anthranilic Acid	80.00
Sulphanilic Acid	33.00
Sulpho Tobias Acid	160.00
Trichloro Benzene (TCB)	24.00
Tobias Acid	155.00
Metanilic Acid	43.00
MTD	120.00

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- Acetaldehide
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- EDTA
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(Prices as on April 23, 1990)

ACID COLOURS	Per Kg.
Acid Violet 4BS	*190.00
Acid Maroon V	110.00
Acid Orange II	112.55
Acid Orange IIY	93.85
Acid Red A	137.00
Acid Scarlet 3R	128.35
Acid Red 3BN	*195.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Patent Blue AS	*280.00
Acid Green V	*375.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	157.15
Acid Black BX	126.95
Acid Black Wax	135.50
Crosein Scarlet MOO	200.30
Procinil Yellow GS (ICI, UK)	265.00
Procinil Red GS (ICI, UK)	530.00
Procinil Blue RS (ICI, UK)	315.00
Procinil Scarlet G (ICI, UK)	600.00
Procinil Orange G (ICI, UK)	250.00
Procinil Rubine (ICI, UK)	550.00

* To get resale price add 6% tax.

DIRECT COLOURS	Per Kg.
Yellow 3GX	114.00
Gun Yellow RCH	175 85
Fast Yellow GCH	171.50
Yellow CFG Hly. Conc.	721.00
Fast Yellow GS	126.96
Fast Yellow CHRS	116.85
Viscose Orange A	210.35
Fast Orange GR	171.50
Red	122.65
Dark Tan	98.15
Red IIR	98.15
Red 4B	217.55
Bordeaux BW	170.10
Fast Scarlet 4BS	223.50
Red 12B	220.45
Bordeaux Hly. Conc.	249.20
Cotton Red N	117.05
Brill. Fast Helio B	362.85
Brill. Fast Helio 2R	385.85
Brill. Fast Helio 2RS	177.30
Brill. Fast Helio BS	116.10
Brill. Violet Extra	181.45
Blue 2B	102.50
Blue G	220.45
Sky Blue FB	242.00
Copper Blue GR	190.25
Fast Greenish Blue GL	114.60
Developed Black BT	149.95
Blue NB-2B	348.45
Blue NB-2BG	214.70
Developed Black NB-GHB	214.70
Green B	142.75
Green NB-B	218.90
Green 2B-N	218.90
Brown MR	197.40
Brown CN	137.00
Golden Brown G	175.85
Catechin G	155.70
Omega Tan	161.45
Catechin GS	102.80
Black E Hly. Conc.	180.15
Black E Extra Hly. Conc.	180.15
Black NB-ER Hly. Conc.	290.50
Red 2B	422.40
Red FB	425.80
Red Violet FBL	622.00
Orange 3R	254.20
Violet 3R	370.50
Violet RL	355.70
Violet 6R	638.20
Scarlet RR	283.50
Rubine 3B	289.10
Rubine CB	449.50
Blue GL	419.00
Blue BGF	805.80
Navy Blue RE	359.90
Brown 3REL	272.80
Black GEL	420.10
Dark Brown 3B	411.10

DISPERSOL COLOURS	Per Kg.
Red B 3B Conc	611.50
Red B 2B Conc	797.90
Red CB Powder	1048.25
Red D2B Powder	599.85
Violet C 4R Conc.	1202.70
Blue BG Conc	580.65
Blue BN Powder	128.20
Blue D 2R Powder	588.25
Navy BT Conc	531.95
Blue B 2G Conc	577.95
Black BT Conc	319.50
Blue BR	482.40
Yellow 7GL	813.20
Yellow 5RX	269.90
Yellow 3G	473.20
Yellow	140.00
Yellow AL	167.20
Yellow Brown REL	311.70
Yellow FFL	571.40
Gold Yellow GG	320.80
Pink REL	593.00
Red BEL	615.60

BASE COLOURS	Per Kg.
Fast Yellow GC	77.75
Fast Orange GC	128.40
Fast Scarlet R	198.05
Fast Scarlet RC	128.40
Fast Scarlet RCR	105.60
Fast Scarlet G	115.75
Fast Scarlet GN	92.95
Fast Scarlet GG	77.75
Fast Scarlet GGS	73.95
Fast Red B	233.50
Fast Red RC	115.75
Fast Red R Flakes	158.80
Fast Red TR	181.60
Fast Red TR Oil	223.35
Fast Red RL	251.20
Fast Red KB Oil	251.20
Fast Bordeaux GP	236.00
Fast Garnet GBC	103.05
Fast Violet B	548.80
Fast Blue BB	566.50

NAPHTHOL COLOURS	Per Kg.
ASG	301.85
AS	205.65
ASSW	379.10
ASBS	253.75
ASBO	266.40
ASD	209.45
ASOL	243.60

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ASPH	336.05
ASE	236.00
ASEL	249.95
ASLB	2002.35
ASBT	2459.45
ASWG	143.00
ASSG	538.65
ASSR	652.60

PROCION COLOURS	Per Kg.
Golden Yellow HR	207.95
Brill. Yellow H4G	145.65
Supra Yellow H-8GP	168.55
Brill. Yellow HE6G	214.75
Yellow G-E4R	276.05
Brill. Yellow H7G	332.30
Yellow M4R	275.45
Yellow MGR	387.65
Brill. Yellow M4G	201.15
Brill. Yellow M8G	366.10
Yellow M3R	244.70
Brill. Orange H2R	303.80
Brill. Red H7B	157.95
Brill. Orange M2R	313.15
Brill. Red H8B	213.55
Brill. Scarlet H RN	245.05
Supra Red H-3BP	179.80
Brill. Red H-F3B	243.45
Brill. Magenta HB	182.00
Brill Red M 5B	160.05
Brill. Red M 8B	218.35
Brill. Pink MB	137.10
Brill. Magenta MB	163.65
Brill. Purple H-3R	219.55
Brill. Purple H-7R	175.40
Navy Blue H 3R	333.75
Brill. Blue H-GR	406.40
Brill. Blue H5G	207.95
Blue H 5RX	286.20
Brill. Blue H 7G	213.95
Brill. Blue H 7RX	358.15
Turquoise HA	265.05
Supra Blue H-3RP	595.30
Supra Turquoise H 2G P	181.50
Blue H-FRD	305.80
Navy Blue H3R	333.75
Blue H 5RX	286.20
Navy Blue M3R	355.70
Brill. Blue MR	405.60
Brill. Blue M RX	214.20
Brill. Blue M-G	226.45
Blue M 4GD	369.40
Navy Blue M RB	341.85
Turquoise M-G	240.30
Brill. Blue M GX	516.25
Blue 3R Acra Powder	718.20
Dark Brown H-6R	248.45
Cobalt Oxide	285.00
Green H4BD	287.00
Green H-E4BI	169.80
Red Brown H IF	143.25
Orange Brown H 28	209.05
Brown M GRN	188.80
Black H-N	314.20

SULPHUR COLOURS	Per Kg.
Navy Blue	210.35
Green G	194.55
Black Grains Extra	72.25
Black Grains OG	73.70
Black GXE Conc.	70.85
Black GXE	57.90
Black GXR	69.40
Black Grains 800	62.80
Black EXR Grains	73.70
Black EXR Grains 800	59.35

VAT COLOURS (ICI)	Per Kg.
Yellow 5G Supra Disperse	561.85
Yellow 5G Acra Conc	818.60
Gold Orange 3G Pdr. Fine	1158.45
Brill. Orange 6R Pdr. Fine	624.35
Gold Orange 3G Supra Disp	693.85
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	1214.15
Brill. Red 3B Supra Disp	867.45
Brill. Purple 3R Acra Powder	827.05
Brill. Purple 2R Hly Conc.	744.25
Brill. Purple 4R Supra Disp.	604.25
Brill. Purple 2R Acra Conc.	779.85
Blue 2R Powder Fine	675.30
Blue BC Acra Con Pdr. Fine	1013.15
Blue BC Conc. Pdr. Fine	713.65
Blue R Conc. Pdr. Fine	719.70
Blue Conc. Powder	645.80
Brill. Blue 2R Hly. Conc.	378.55
Blue RR Supra Powder	629.35
Brill. Blue 2R Supra Disp.	115.65
Dark Blue 2R Powder Fine	512.65
Blue BC Supra Disp.	419.65
Jade Green XBN Powder Fine	555.80
Jade Green XBN Acra Conc. Pdr	1026.05
Jade Green 2G Pdr. Fine	533.25
Jade Green 2G Ptg. Paste	125.40
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Supra Disp.	618.00
Olive D Pdr. Fine	563.90
Olive Green B Supra Disp.	421.70
Jade Green XBN Supra Disp. (N)	327.30
Olive OMW Powder Fine	698.55
Olive OMW Supra Disp.	538.05
Olive D Supra Disp.	361.70
Olive R Supra Disp.	470.25
Olive D. Ptg. Paste	193.00
Olive Green B Ptg. Paste	199.10
Olive Green B Acra Conc.	741.10
Olive R Acra Conc.	779.85
Brown R Pdr. Fine	869.45
Dark Brown 3R Fine	826.25
Brown G Supra Disp.	582.05
Brown 2G Supra Disp.	716.10
Brown R Supra Disp.	547.35
Brown BR Powder	867.75
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp	529.60
Brown G Acra Conc.	967.95
Brown M. Powder Fine	768.80
Grey M. Supra Disp.	585.45
Blue BC Acra Conc. Pdr. Fine	762.70
Direct Black AC Supra Disp.	415.75
Direct Black AC Pdr. Fine	574.70
Direct Black CH Supra Disp.	490.45
Direct ACD Ptg. Paste	217.15

Bombay Drugs Market

Prices as on April 21, 1990

Product	Rs./kg.	Product	Rs./kg.	Product	Rs./kg.
Acetazolamide IP	700.00	Diloxanide Fumarate IP	370.00	Morpholine	140.00
Acriflavine BPC	850.00	Diphenhydramine HCl	310.00	Niacinamide	190.00
Aluminium Hydroxide IP	36.00	Disodium Hydrogen Citrate	80.00	Nifedipine	1100.00
Ampicillin Trihydrate	1550.00	Ephedrine HCl	2000.00	Nitrofurazole	280.00
Aminophylline	350.00	Erythromycin Stearate	2100.00	Oxyphenbutazone	585.00
Albendazole	2300.00	Ethambutol IP	925.00	Paracetamol	160.00
Analgin	260.00	Ferrous Fumarate	40.00	Pectin IP	480.00
Aspirin IP	85.00	Folic Acid IP	4200.00	Pepsin 1:3000	300.00
Atenolol	3000.00	Furosemide IP	1900.00	Phenbarbitone	510.00
Benzoic Acid IP	35.00	Furazolidone IP	370.00	Pheniramine Maleate	925.00
Bromhexine HCl	2400.00	Guanidine Nitrate	40.00	Phenyl Butazone USP	600.00
Caffeine Citrate IP	350.00	Gallic Acid	275.00	Piperazine Citrate	85.00
Caffeine IP	400.00	Haloperidone	19,000.00	Potato Starch	65.00
Calcium Gluconate IP	48.00	Hematropine Methyl Bromide	9.25	Propranolol HCl	825.00
Calcium Glycerophosphate	160.00	Hydrazine Hydrate	90.00	Rifampicin IP	3900.00
Calcium Lactate	40.00	Ibuprofen IP	370.00	Saccharine Sodium	250.00
Calcium Phenthonate	450.00	I.N.H.	270.00	Salbutamol Sulphate	7.60
Cetrimide IP	200.00	Inosite IP	925.00	Sodium Iodide	400.00
Chloramphenicol Powder	1400.00	Iodochloro	500.00	Sodium Methoxide	96.00
Chlorbutol	95.00	Lactose IP	38.00	Sorbitol Powder	115.00
Chlorhexidine Gluconate 20% BP	210.00	Lactic Acid	90.00	Sorbitol USP	13.00
Chloroquin Phosphate	850.00	Lignocaine HCl	325.00	Sulphacetamide	300.00
Chlorpromazine HCl	1550.00	Lignocaine Base	325.00	Sulphamethoxazole	285.00
Choline Chloride FG	30.00	L. Lycine Feed	140.00	Tinidazole	350.00
Choline Chloride IP	60.00	L. Lysine Pharma	250.00	Theophylline Anh.	400.00
Citric Acid IP	40.00	Magaldrate IP	46.00	Trimethoprim IP	1000.00
C.P. Maleate IP	1150.00	Magnesium Hydroxide	22.00	Vitamin A Palmitate	2600.00
Dapson IP	280.00	Magnesium Trisilicate IP	10.50	Vitamin B6 Hydrochloride	1400.00
D.C. Citrate	265.00	Mannitol USP	100.00	Vitamin B2 5-Phosphate	4300.00
Dexamethasone	90.00	Mebendazole	610.00	Vitamin C Plain	285.00
Dicyclomine HCl	1800.00	Mercurochrome NF	280.00	Vitamin C Coated	290.00
Diethyl Carbamazine Citrate	265.00	Methyl Chloroformate	80.00	Vitamin K3 W/S	675.00
Di-iodohydroxyquinoline	560.00	Metronidazole IP	415.00		

Delhi Market

DELHI: APRIL 20, (NNS) Paraffin wax registered a sharp rise of Rs. 40 at Rs. 950 per 50 kg in the Delhi chemicals market during last week, in view of spurt in demand from consumers coupled with dwindling stock and fall in fresh supply, reports NNS. Sodium nitrite advanced by Rs. 25 at Rs. 1,000/1,050 due to short supply. Soda ash moved up again by Rs. 5 at Rs. 360/380 due to hike in its prices by manufacturers. Similarly soda bicarb hardened by Rs. 10 at Rs. 325/345 due to dwindling supply. In view of reduced offerings and sustained demand, caustic soda flakes rose by Rs. 10 at Rs. 575 per 50 kg.

Menthol flake and bold jumped up sharply by Rs. 30/35 at Rs. 465 per kg owing to negligible supply from U.P. caused by fall in production due to off season. Menthol medium was dearer from Rs. 400 to Rs. 425. Mentha oil moved up by Rs. 15 at Rs. 270/290, while DMO drifted lower by Rs. 5 in view of accumulation of stock.

Tartaric acid France rose by Rs. 2 at Rs. 332 because of fall in import from France, while tartaric acid Swastic brand desi was quoted at its last week level of Rs. 210 per kg. In the wake of revision in the prices of sodium hydro by Rs. 4 by manufacturers from April 1990, consequently prices of sodium hydrosulphite Gulshan and Tamil Nadu quoted higher by Re. 1 each at Rs. 37 and Rs. 38 per kg. Damosha hydro edged up by 50 paise while Kalali ruled quiet at Rs. 40 per kg.

Titanium dioxide TTP and RC-822 dropped by Rs. 2/4 at Rs. 74 and Rs. 94 in the wake of negligible demand from plastic and paint units coupled with better stock position. Titanium dioxide K-brand drifted lower by Rs. 2 at Rs. 70. Naphthalene balls slipped by Rs. 50 at Rs. 1,500 on withdrawal of buying support. Camphor powder eased by Re. 1 at Rs. 94 in view of improved supply.

Acid slurry soft dipped by Rs. 2 at Rs. 28. Potassium permanganate suffered a fall of Rs. 200 at Rs. 2,600/3,000 due to better supply. Borax crystal looked up by Rs. 25 at Rs. 950 due to good demand.

Citric acid (Chinese) slipped by Rs. 30 at Rs. 2,000 on lower Bombay advices. Other chemicals and dyes and colours remained unchanged at their previous closing.

(DELHI MARKET RATES AS ON APRIL 20, 1990)

Ammonia Bicarb (Per 25 Kg.)	145.00
Mercury (Per flask)	11,000.00
Soda ash (Per bag)	360/380.00
Ammonium Chloride (50 Kg.)	110/180.00
Caustic soda flakes (50 Kg.)	575.00
Citric acid (Per 50 Kg.)	2,000/2,550.00
Stable Bleaching Powder Shriram (Per 25 Kg.)	101.00
Stable Bleaching Powder KCl (Per 25 Kg.)	90.00
Stable Bleaching Powder Maruti (Per 25 Kg.)	90.00
Stable Bleaching Powder Modi (Per 25 Kg.)	92.00
Sodium Bicarbonate (50 Kg.)	325/345.00
Sodium Hydrosulphite (Per Kg.)	37.00/40.00
Rangolite (Per Kg.)	83.00
Tartaric acid France (Per Kg.)	332.00
Sufolite (Per Kg.)	60.00
Chatkolite (Per Kg.)	50.00
DMO (per Kg.)	100.00
Boric acid Technical (Per 50 Kg.)	1,400.00
Paraffin Wax (Per 50 Kg.)	950.00
Slack wax (Per metric tonne)	8,900.00
Tartaric Acid (Swastik Per Kg.)	210.00
Borax Granular (Per 50 Kg.)	825.00
Borax Crystal (Per 50 Kg.)	950.00
Sodium Nitrite (Per 50 Kg.)	1,000/1,050.00
Sodium Nitrate (Per 50 Kg.)	440.00
Camphor Thal (Per Kg.)	103.00
Camphor Powder (Per Kg.)	94.00
Menthol Bold (Per Kg.)	465.00
Menthol Medium (Per Kg.)	425.00
Menthol Flake (Per Kg.)	380.00
Menthal Oil (Per Kg.)	275/290.00
Glycerine (Per Kg.)	55/58.00
Sodium Silicate (Per quintal)	300/400.00
Hexamine (Per Kg.)	34.00
Acetic Acid Glacial (Per Kg.)	15.00
Copper Sulphate (Per quintal)	2,300/2,600
Formic Acid (Per Kg.)	22.50
Formaldehyde (Per Kg.)	8.50
Hydrogen Peroxide (Per Kg.)	27.50/28.50
Calcium Carbonate (Per Tonne)	2,500/5,500
Acid Slurry Soft (Per Kg.)	28.00
Acid Slurry Hard (Per Kg.)	38.00
Phosphoric Acid (Per 50 Kg.)	1,750.00
Potassium Nitrate (Per quintal)	900/1,200.00
Potassium Permanganate (Per 50 Kg.)	2,600/3,000.00
Sodium Bichromate (Per 50 Kg.)	1,575/1,600.00
Trisodium Phosphate (50 Kg.)	625.00
Titanium Dioxide Anatase T.T.P. (Per Kg.)	74.00
Titanium Dioxide RC-822 (Per Kg.)	94.00
Titanium Dioxide K-Brand (Per Kg.)	70.00
Titanium Dioxide RCR-2 (Per Kg.)	N.A.
Zinc Oxide (Per Kg.)	44.00/50.00
Phenol Carbolic Acid (Per Kg.)	37.00
Carbon Tetrachloride (Per Kg.)	24.75
Chloroform (Per Kg.)	28.00
Sodium Sulphate (Per metric tonne)	3,400/3,700.00
Naphthalene Balls (Per 50 Kg.)	1,550.00

DYES & COLOURS	(Per Kg.)
Naphthol AS	175/201.65
Naphthol ASG	180/295.20
Naphthol ASBS	210/248.45
Naphthol ASTR	275/360.45
Naphthol ASOL	210/238.60
Naphthol ASBO	195/260.75

DIRECT DYES	(Per Kg.)
Black E. Conc.	120/176.90
Diazo Black B.T.	105/147.55
Green B	90/140.55
Blue 2-B	60/101.40
Blue 2-B 225% (JNR)	125.00
Sky Blue FB	160/235.05
Basic Auramine	55/110.00
Basic Rhodamine	300/425.00
Basic Methylene Blue	100/180.00
Basic Violet	165/210.00
Basic Malachite Green	175.00
Acid Orange	75/111.20
Congo Red H/C	75/120.95

Madras Market

There was noticeable activity in the Madras chemicals market during the week under review. Most of the items tended to move upwards, especially caustic soda which was quoted at Rs. 13,000 per MT striking a rate that was Rs. 800 higher than last week's level. A few other items like menthol crystals and paraffin wax were quoted at slightly lower levels. Some fluctuation was exhibited in the solvents section also.

(MADRAS MARKET RATES AS ON APRIL 20, 1990)

Acetic Acid Glacial (per kg)	15.50
Aluminium Sulphate Iron free (per MT)	4,000.00
Ammonium Bicarbonate (per 25 kgs)	150.00
Ammonium Chloride (per MT)	3,000.00
Acid Slurry (per kg)	31.00
Barium Carbonate (per kg)	9.50
Barium Chloride (per kg)	8.50
Boric Acid Technical (per kg)	27.00
Bleaching Powder (per 50 kgs)	225.00
Borax (per 50 kgs)	750.00
Caustic Soda Flakes -- Mettur Chemicals (per MT)	13,000.00
Caustic Soda Flakes -- Andhra Sugars (per MT)	13,000.00
Calcium Chloride 70% Solid (per MT)	3,000.00
Calcium Chloride Anhydrous (per MT)	5,800.00
Calcium Carbonate (Activated) (per MT)	6,300.00
Calcium Carbonate (Precipitated) (per MT)	5,250.00
Citric Acid (per kg)	48.00
Copper Sulphate (per kg)	24.00
Cresylic Acid 98-99% (per kg)	130.00
Pure Para Cresol 96% (per kg)	122.00
Meta Para Cresol 42% (per kg)	52.00
Formic Acid (per kg)	26.00
Formaldehyde (per kg)	8.00
Glue Flakes (per kg)	15.00
Glycerine I.W. (per kg)	52.00
Hydrosulphite of Soda (TCPL) (per kg)	37.00
Hydrosulphite of Soda (IDI) (per kg)	42.00
Hydrosulphite of Soda (BASF) (per kg)	42.00
Hexamine (per kg)	31.50
Hyflosupercell (per kg)	19.50
Hydrogen Peroxide (per kg)	31.50
Litharge (per kg)	40.00
Lead Acetate (per kg)	38.00
Magnesium Carbonate (per kg)	18.00
Magnesium Chloride (per kg)	3.75
Maleic Anhydride (per kg)	40.00
Menthol Crystals (per kg)	350.00
Oxalic Acid (per kg)	19.00
Paraffin Wax (per kg)	17.00
Potassium Bichromate (per kg)	36.00
Phosphoric Acid (per kg)	29.00
Polyvinyl Alcohol Powder (per kg)	130.00
Pentaerythritol (per kg)	52.00
Phthalic Anhydride (per kg)	30.00
Soda Ash (TAC) (per 75 kgs)	440.00
Soda Ash (TATA) (per 75 kgs)	445.00
Sodium Bicarbonate (TATA) (per 50 kgs)	400.00
Sodium Silicate (per MT)	3,750.00
Sodium Bichromate (per kg)	28.00
Sodium Nitrate (per kg)	8.50
Sodium Nitrite (per kg)	15.00
Sodium Sulphide Flakes (per kg)	14.00
Sodium Bisulphite (per kg)	8.50
Sodium Alginate (per kg)	275.00
Sodium Acetate (per kg)	7.50
Sodium Sulphate (Anhydrous) (per kg)	3.75
Titanium Dioxide (Anatase) (per kg)	75.00
Titanium Dioxide (Rutile) (per kg)	90.00
Trisodium Phosphate (per kg)	10.00
Urea (Technical) (per kg)	3.00
Zinc Oxide (per kg)	49.00
Zinc Chloride Powder (per kg)	12.50
Zinc Sulphate (per kg)	8.00

SOLVENTS

Acetone -- HOCL (per kg)	18.50
Butanol (per kg)	34.00
Butyl Acetate (per kg)	38.00
Benzene (per lit)	14.00
Cellosolve (per kg)	50.00
Carbon Tetra Chloride (per kg)	21.00
Chloroform (per kg)	30.00
Diacetone Alcohol (per kg)	30.00
Diethylene Glycol (per kg)	36.00
Dichloroethane (per kg)	18.00
Di-octyl Phthalate (per kg)	45.00
Di-N-butyl Phthalate (per kg)	47.00
Ethyl Acetate (per kg)	20.00
Isopropyl Alcohol (per kg)	28.00
Methanol (per kg)	10.00
Methylene Chloride (per kg)	23.00
Methyl Ethyl Ketone (per kg)	34.00
Methyl Isobutyl Ketone (per kg)	41.00
Phenol (per kg)	38.00
Sorbitol (per kg)	14.50
Triethanolamine (per kg)	90.00
Trichloroethylene (per kg)	27.00
1-1-1 Trichloroethane (per kg)	29.00
Turpentine (per lit)	16.00
Toluene (per lit)	14.00
Xylene (per lit)	17.00

Shipping News

VESSELS DUE IN BOMBAY FOR EXPORT LOADING

Due Date (1)	Steamer's Name & Flag (2)	Agents (3)	Will load for (4)	Approx. sailing dt. (5)
27/4	Seacrest Achiever (Voy-212)	Merzario/	Jeddah; Hodeidah; P. Sudan; Ravenna; Ancona; Piraeus; Venice; Trieste. (Carting at M.O.D. No. 1).	3/5
		Seaspeed/	Tilbury; London; Felixstowe; Manchester; Liverpool; Avonmouth; Le Havre; Rotterdam; Hamburg; Antwerp; Bremerhaven and Scandinavian ports. (Carting at M-178 Cotton Depot).	
		L. Triest/	Jeddah; Trieste; Venice; Ravenna; Rijeka; Naples. (Carting at M-171/173 Cotton Depot).	
		U.L.A.	P. Sudan; Aden; Djibouti; Hodeidah. (Carting at E-Grain Depot).	
		Killick/	Jeddah; Felixstowe; London; Liverpool; Manchester; Bristol; Avonmouth; Leeds; Glasgow; Tilbury; Birmingham; Dublin; Belfast; Rotterdam; Hamburg; Le Havre; Antwerp; Bremen; Bremerhaven; Fos; Valencia; Marseilles; Barcelona & Scandinavian ports. (Carting at E-Shed Grain Depot).	
		Patvolk/ S.W. & Co./ Trident/ P & O	Tilbury; London; Felixstowe; Avonmouth; Manchester; Liverpool; Glasgow; Leeds; Birmingham; Dublin; Belfast; Bristol; Marseilles; Genoa; Barcelona; Le Havre; Antwerp; Rotterdam; Hamburg; Bremerhavan; Copenhagen; Oslo; Helsinki; Malmao; Gothenburg; Stockholm; Aarhus; Alborg. (Carting at Timber Pond No. 4 for S.W. & Co., Trident & P&O) (Carting at H.B. No. 4 for Patvolk).	
2/5	CMB Merkur (Nhava Sheva)	C.M.B.	Djibouti; Port Sudan; Jeddah; La Spezia; Valencia; Genoa; Barcelona; Marseilles; Tunis; Casablanca; Tangier; Alexandria; Piraeus; Mersin; Limassol; Felixstowe; London; Liverpool; Manchester; Birmingham; Avonmouth; Dublin and all inland destinations in U.K.; Antwerp; Rotterdam; Hamburg; Bremen; Leixoes; Lisbon; Copenhagen; Oslo; Gothenburg; Stockholm; Malmao; Aarhus; Helsinki. (Carting at Kalamboli).	4/5
29/4	Lanka Amila (Pan)	Seahorse	Hodeidah; Jeddah; Aqaba (Direct); Felixstowe; London; Liverpool; Manchester; Avonmouth; Dublin; Glasgow; Wembly; Liecester; Immingham; Birmingham; Leeds; Antwerp; Bremen; Copenhagen; Gothenburg; Hamburg; Rotterdam; Oslo; Stockholm; Helsinki; Aarhus; Malmao; Norkopping. (Carting at M.O.D. No. 3).	3/5
27/4	Dorothee	Samrat/ Hindustan/ Merzario	Felixstowe; Hamburg; Rotterdam; Also London; Liverpool; Leixoes; Lisbon; Manchester; Avonmouth; Wembly; Birmingham; Leicester; Le Havre; Bremen; Amsterdam; Antwerp; Copenhagen; Leeds; Aarhus; Gothenburg; Oslo; Helsinki; Stockholm; Belfast and all destinations in U.K., Benelux; Germany; Italy; France; Switzerland; and Austria. (Carting at M.O.D. No. 1 for Merzario) (Carting at M.O.D. No. 2 & B. Pier Extn. for Samrat & Hindustan).	3/5
30/4	Maersk Clementine	Volkart Fleming	Leghorn; Marseilles; Naples; Barcelona; Bilbao; Bordeaux; Alicante; Genoa; Valencia; Bremen; Jeddah; Antwerp; Rotterdam; Bremerhaven; Hamburg; U.K. & Scandinavian ports. (Carting at M.O.D. No. 3).	4/5
29/4	Vishva Parag (Ind)	S.C.I.	P. Said; Felixstowe; Hamburg; Rotterdam; Antwerp; Bremen; Liverpool; Le Havre; Manchester; Avonmouth; London; Belfast; Aarhus; Oslo; Helsinki; Copenhagen; Gothenburg and all inland destinations. (Carting at T.P. No. 1).	3/5
5/5	Sam Houston	M.S.P.L.	Aqaba; Assab; P. Suez; (Alexandria). (Carting at P/Q-PD).	5/5
6/5	Tibor Szamuely (Rus) (V-108 W/B)	Transocean	Odessa; Izmail; Reni (U.S.S.R.); Russe; Bulgaria; Budapest (Hungary); Linz; Vienna (Austria); Bratislava (Czechoslovakia); Deggendorff; Regensborg (West Germany). (All Ports on River Danube). (Carting at N/O-PD & G-PD).	7/5
25/4	Sambrine	S.D.S.	Port Louis; Tamatave; Re Union.	5/5
28/4	Oyster Bay (Dan)	Arebee/	Dar Es Salaam & Mombasa (Direct); Kampala; Jinja; Toronto; Lugazi; Entebee (Uganda); Kigali; (Rwanda); Kitwe; Lusaka; Ndola (Zambia); Lilongwe; Blantyre (Malawi); Maputo; Zanzibar. (Carting at M.J. Cotton Depot).	1/5
		P&O	Mombasa; Dar Es Salaam (Direct); Beira; Mahe & inland destinations in East Africa. (Carting at Timber Pond No. 4).	
1/5	Vishva Kaumudi	S.C.I.	Seychelles; P. Louis; Mombasa; Dar Es Salaam (Direct) (Carting at T.P. No. 1).	7/5

(1)	(2)	(3)	(4)	(5)
26/4	Vega (Sing) (V-12A/B)	O.S.A./	P. Kelang; Singapore; Kaohsiung; Hongkong; Bangkok; Kobe; Yokohama; Nagoya; Moji; Osaka; Busan; Tokyo; Simizu; Keelung; Tsingtao; Quindao; Xiangang; Shanghai. (Carting at M-178/180 C.D.)	2/5
		M.S.P.L.	Singapore; Bangkok; P. Kelang; Penang; Jakarta; Manila. (Carting at E. Grain Depot).	
27/4	Maribor (Yug)	Depe	Hongkong; Keelung; Kaohsiung; Kobe; Yokohama; Busan.	5/5
29/4	Lanka Amila	Seahorse	Singapore; Penang; P. Kelang; Bangkok; Hongkong; Keelung; Kobe; Yokohama & FCL only Busan; Inchon; Osaka; Tokyo; Nagoya; Kaohsiung. (Carting at M.O.D. No. 4).	3/5
30/4	Maersk Clementine (Sing)	Volkart Fleming	Penang; Singapore; Hongkong; Keelung; Kaohsiung; Busan; Main Japan Ports; Manila; Jakarta; Surabaya; Bangkok; P. Kelang; Chinese Ports. (Carting at M.O.D. No. 2).	4/5
3/5	Kalidas	S.C.I.	Singapore and Far East Ports. (Carting at T.P. No. 1).	6/5
5/5	Sam Houston	M.S.P.L.	Singapore. (Carting at P/Q-PD)	5/5
29/4	Lanka Amila	Seahorse	Brisbane; Fremantle; Sydney; Melbourne; Adelaide. (Carting at M.O.D. No. 3)	3/5
3/5	Kalidas (Ind)	S.C.I.	Melbourne; Fremantle; Adelaide; Sydney. (Carting at T.P. No. 1).	6/5
26/4	Zanoobia (Iraqi)	Al Rafidain	Umm Qaser.	4/5
26/4	Ardal (Dan)(V-13)	Mackintosh	Muscat; Dubai.	3/5
27/4	O. Great	Links Ship	Dubai; Sharjah.	4/5
27/4	Seacrest Achiever (Voy-212)	Parekh/	Muscat; Dubai; Sharjah; Abu Dhabi; Bahrain; Dammam; Kuwait; Baghdad. (Carting at Timber Pond No. 3).	3/5
		Penguin/	Dubai; Abu Dhabi; Sharjah; Doha; Muscat; Jebel Ali; Kuwait; Bahrain. (Carting at H.B. No. 4).	
		Sai Ship/	Dubai; Muscat; Sharjah; Abu Dhabi. (Carting at E-Grain Depot).	
		U.L.A./	Dubai; Abu Dhabi; Doha. (Carting at E-Grain Depot).	
		Merzario/	Dubai; Sharjah; Abu Dhabi; Muscat; Doha; Dammam; Kuwait; Bahrain. (Carting at M.O.D. No. 1).	
		L. Triest/	Dubai; Dammam; Riyadh; Muscat; Abu Dhabi; Doha; Kuwait; Bahrain. (Carting at M-171/173 Cotton Depot).	
		Killick/	Dubai; Dammam; Riyadh; Bahrain; Kuwait. (Carting at E Shed Grain Depot)	
		O.S.A./	Dubai; Abu Dhabi; Bahrain; Doha; Muscat; Kuwait; Dammam. (Carting at M-178/180 Cotton Depot).	
		Seaspeed/	Dubai; Dammam; Bahrain; Kuwait; Doha. (Carting at M-178 Cotton Depot)	
		Kanika	Dubai; Abu Dhabi; Sharjah; Muscat; Kuwait; Bahrain. (Carting at T.P. No. 3)	
29/4	Lanka Amila	Seahorse	Dubai; Khorfakkan; Sharjah; Muscat; Dammam; Riyadh; Kuwait. (Carting at M.O.D. No. 3).	3/5
30/4	Maersk Clementine	V. Fleming	Dubai; Dammam; Muscat; Bahrain; Kuwait; Riyadh; Doha. (Carting at M.O.D. No. 2).	4/5
1/5	Soya Maru	Parekh	Dammam.	5/5
29/4	Lanka Amila	Seahorse	Colombo. (Carting at M.O.D. No. 3).	3/5
3/5	Kalidas	S.C.I.	Colombo; Chittagong. (Carting at T.P. No. 1).	6/5
27/4	Seacrest Achiever	Patvolk/P&O/ S.W.&Co/	S. American Ports. (Carting at T.P. No. 4 for P&O, S.W.& Co. & Trident) (Carting at Hay Bunder No. 4 for Patvolk).	3/5
		Trident/	New York; Norfolk; Savannah; Baltimore; Boston; Charleston; Houston.	
		Seaspeed	New York; Baltimore; Norfolk; Savannah; Charleston; Houston; & S. American ports. (Carting at M-178 Cotton Depot).	
29/4	Vishva Parag (Ind)	S.C.I.	New York; Baltimore; Savannah (Direct) & other inland destinations. (Carting at Timber Pond No. 1).	3/5
29/4	Lanka Amila	Seahorse	New York; Baltimore; Charleston; Norfolk. (Carting at M.O.D. No. 3).	3/5
30/4	Maersk Clementine (Sing)(V-9009)	Volkart Fleming	New York; Philadelphia; Baltimore; Norfolk; Charleston; Savannah; Jacksonville; Miami; New Orleans; Houston; Toronto; Montreal; Chicago; Atlanta; Denver; Dallas; Wilmington; Milwaukee; Detroit; Minneapolis; Memphis; Nashville; Cleveland; Phoenix; Boston; Los Angeles; Vancouver; Seattle; San Francisco; Porland; Longbeach; Mexican & S. American Ports. (Carting at M.O.D. No. 2).	4/5
2/5	CMB Merkur (Nhava Sheva)	C.M.B.	Norfolk; New York; Baltimore; Philadelphia; Charleston: Savannah; Houston; Miami; New Orleans; Via Antwerp; Montreal; Toronto; Halifax. (Carting at Kalamboli).	4/5
5/5	Sam Houston (Arne)	M.S.P.L.	Philadelphia; Baltimore; Norfolk; New Orleans; Houston; Savannah; New York. (Carting at P/Q-PD).	5/5

(1)	(2)	(3)	(4)	(5)
27/4	Seacrest Achiever	Patvolk/P&O/ S.W.& Co./ Seaspeed	West African ports. (Carting at T.P. No. 4 for P&O and S.W.& Co.) (Carting at Hay Bunder No. 4 for Patvolk). West African ports. (Carting at M-178 Cotton Depot).	3/5
27/4	Dorothee	Merzario	Dakar; Abidjan; Monrovia; Lome; Douala; P. Noire; Matadi; Libreville; Cotonou; P. Gentle; Lagos; P. Harcourt; Warri; Freetown; Conakry; Louanda; Nouakchott; Guinea; Blassa. (Carting at M.O.D. No. 1).	3/5
30/4	Maersk Clementine	V. Fleming	Lagos/Apapa; Dakar; Freetown; Monrovia; Lome; Cotonou; Doula; Tema. (Carting at M.O.D. No. 2).	4/5
2/5	CMB Merkur (Nhava Sheva)	C.M.B.	Lagos; Abidjan; Lome; Douala; Matadi; Port Gentil; Pointe Noire; Nouakchott; Cotonou; Dakar; Luanda; Monrovia; Tema via Antwerp. (Carting at Kalamboli).	4/5

VESSELS DUE FOR IMPORT DISCHARGE

Due Date	Steamer's Name	Agents	From
5/5	Bharatendu (II Call)	S.C.I.	Odessa/Med.
3/5	Ever Bridge (V-029)	Greenways	F. East/U.S.
7/5	Fatima	Prudential	Cont.
8/5	Hoegh Dyke	Patvolk	U.S.A.
3/5	Ind. Reliance	I.S.S. Co.	U.K. Cont.
8/5	Jag Kala	S.C.I.	Japan/F. East
3/5	Kalidas	S.C.I.	Australia
5/5	Sam Houston	M.S.P.L.	U.S.A.
6/5	Tibor Szamuely (V-108)	Transocean	U.S.S.R.
3/5	Vishva Umang	S.C.I.	U.K. Cont.

ATTENTION ALL READERS

PLEASE LET US KNOW WHAT NEW FEATURES YOU WOULD LIKE US TO INCORPORATE OR WHICH FEATURES YOU FIND REDUNDANT. YOUR PROMPT REPLY WILL BE HIGHLY APPRECIATED.

Address all letters to
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CHEMICAL WEEKLY
306, Shri Hanuman Industrial Estate,
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Materials Imported

MATERIALS IMPORTED MADRAS (From 1.2.90 to 11.2.90)

ACETYLENE BLACK: From Singapore: Indian National Ind. Ltd., 17,200 Kgs., Rs. 5,11,550.

ANISALDEHYDE: From Japan: Cheminor Drugs Ltd., 2,025 Kgs., Rs. 2,83,791.

ALPHA PHENYL ETHYLAMINE: From Japan: Cheminor Drugs Ltd., 360 Kgs., Rs. 2,60,957.

ALUMINIUM OXIDE: From USA: Grindwell Norton Ltd., 3,293 Kgs., Rs. 2,20,561.

ALUMINIUM HYDROXIDE GEL: From Denmark: Indian Vertinary Research Inds., 1,250 Kgs., Rs. 1,61,567.

AROMATIC CHEMICALS: From UK: Aromatics India, 5 Kgs., Rs. 21,430.

BUTYL STEARATE: From Japan: Straw Products Ltd., 450 Kgs., Rs. 33,533.

CHLORO ACETYL CHLORIDE: From Japan: Siris India Ltd., 32 MTs., Rs. 8,23,464.

CAPROLACTAM: From Netherlands: Shri Ram Fibres Ltd., 300 MTs., Rs. 72,06,043.

CARBON BLACK: From Japan: Indo Matsuhila Carbon Co., 15,300 Kgs., Rs. 4,77,001.

DICHLORO NITROPHENOL: From UK: Current Chemicals India Pvt. Ltd., 1,195 Kgs., Rs. 1,20,819.

ETHOXY METHYLENE DIETHYL MALONATE: From France: Nakoda Chemicals, 720 Kgs., Rs. 1,60,713.

FAT LIQUORS: From FRG: Salma International, 4 Nos., Rs. 3,495.

GRISEOFULVIN MICRO BP 80: American Remedies Pvt. Ltd., 100 Kgs., Rs. 74,929.

HEXYL CINNAMIC ALDEHYDE: From Japan: Vasu Agarbathies, 876 Kgs., Rs. 1,00,622.

HYDROXY PHENYL GLYCINE (DANE SALT): From Netherlands: SOL Pharmaceuticals Ltd., 2,000 Kgs., Rs. 7,74,304.

ISOBORNYL CYCLOHEXANOL: From Japan: Karnataka Soaps and Detergents, 700 Kgs., Rs. 16,240.

LACTOSE BP/USP: From Netherlands: Eskayef Ltd., 19,000 Kgs., Rs. 2,64,577.

LINALOL: From France: Shalimar Agarbathi Co., 500 Kgs., Rs. 73,029.

LUTIDINE: From Japan: TTK Chemicals Ltd., 555 Kgs., Rs. 1,24,037.

LYSINE MONO HCl: From Korea: SKM Animal Feeds & Foods India, 10,500 Kgs., Rs. 6,67,309.

PARAFFIN: From China: Tamil Nadu Petroproducts Ltd., 2,052 Kgs., Rs. 1,66,61,377.

PHOSPHORIC ACID: From USA: Madras Fertilisers Ltd., 8,204 Kgs., Rs. 5,80,97,932.

POTASSIUM BROMIDE: From Netherlands: Hindustan Photo Films Co., 16,650 Kgs., Rs. 5,00,917.

2-MERCAPTOBENZIMIDAZOLE: From Japan: Shri Ram Fibres Ltd., 500 Kgs., Rs. 94,199.

MYRISTIC ACID: From Japan: Straw Products Ltd., 500 Kgs., Rs. 33,871.

SILANE: From USA: Carborundum Universal Ltd., 73 Kgs., Rs. 3,579.

SODIUM POLYSTYRENE SULPHONATE: From USA: Christian Medical College, 23.6 Kgs., Rs. 10,608.

STYRENE ACRYLONITRILE: From Korea: BPL Sanyo Tech. Ltd., 2,500 Kgs., Rs. 79,292.

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SULPHAMETHOXY PYRIDAZINE BP: From Hong Kong: Ramakrishna Organics Pvt. Ltd., 250 Kgs., Rs. 1,20,930.

TARTARIC ACID: From Spain: Bush Boake Allen (India) Ltd., 6,000 Kgs., Rs. 6,70,261.

TITANIUM DIOXIDE: From USA: Vikas Paints and Chemicals, 16,140 Kgs., Rs. 6,70,261.

TRIMETHOXY BENZALDEHYDE: From Netherlands: Inventaa Chemicals, 4,400 Kgs., Rs. 17.74,506.

VANILLIN: From USA: Bush Boake Allen (I) Ltd., 2,000 Kgs., Rs. 5,15,744.

PLASTIC MATERIALS IMPORTED MADRAS

(1.2.90)

HDPE: From UAE: Earnest Decopack Inds. Pvt. Ltd., 17 MTs., Rs. 2,32,919; From Netherlands: Arkay Impex, 2,000 Kgs., Rs. 4,52,996; From Singapore: Hoysala Blow Moulders (I) Ltd., 17 MTs., Rs. 2,63,060; From Japan: Bharath Trading Corpn., 24 MTs., Rs. 3,68,253; Bharati Trading Corpn., 8 MTs., Rs. 12,275.

HDPE RESIN: From Singapore: Jampex Enterprises, 52.150 MTs., Rs. 5,54,823.

POLYACETAL MOULDING POWDER: From USA: Polyolefins Inds. Ltd., 13,575 Kgs., Rs. 5,36,761.

POLYETHER POLYOL: From USA: V. Foam Pvt. Ltd., 16,300 Kgs., Rs. 3,24,377.

POLYMETHACRYLATE RESIN: From Japan: KCP Ltd., 75 Kgs., Rs. 34,704.

POLYPROPYLENE: From France: MM Rubber Co. Ltd., 32,500 Kgs., Rs. 5,53,336; From Singapore: Hindustan Plastics Pvt. Ltd., 16 MTs., Rs. 2,47,550.

POLYPROPYLENE HOMOPOLYMER: From USA: Abirami Polybag Inds., 30 MTs., Rs. 4,44,546.

MATERIALS IMPORTED MADRAS

(From 3.2.90 to 7.2.90)

ALUMINIUM HYDROXIDE: From FRG: Carborandum Universal, 200 Kgs., Rs. 2,00,903.

AROMATIC CHEMICALS: From Switzerland: Bush Boake Allen (I) Ltd., 160 Kgs., Rs. 62,068; From Japan: Bush Boake Allen (I) Ltd., 25 Kgs., Rs. 30,710.

CARBON BLACK: From Korea: MRF Ltd., 123 MTs., Rs. 13,77,145; 123.2 MTs., Rs. 13,97,144; From USA: Murugappa Electronics Ltd., 273 Kgs., Rs. 19,061.

CELITE 206: From USA: Hindustan Cylinder Co., 31,434 Kgs., Rs. 27,839.

CHLOROPYRIDINE: From USA: Venkatrama Chemicals, 5,980 Kgs., Rs. 22,01,028.

COUMARIN: From Belgium: Padmini Products, 1,000 Kgs., Rs. 2,57,072.

CYCLOPROPYLAMINE: From FRG: Dr. Reddy's Labs., 450 Kgs., Rs. 5,56,376.

DIMETHYL FORMAMIDE: From Japan: Cheminor Drugs Ltd., 15.2 MTs., Rs. 2,61,311

ETHYL CYANO ACRYLATE: From FRG: 38 Kgs., Rs. 32,957.

4 HYDROXY PHENYL ACETAMIDE: From UK: ICI India Ltd., 504.66 Kgs., Rs. 4,51,144.

HYDROXYLAMINE SULPHATE: From Netherlands: Standard Organics Ltd., 20,000 Kgs., Rs. 6,45,253.

GUM BENZOIN: From Singapore: Damodar & Co., 251 Kgs., Rs. 10,339; Sanghvi Amritlal Chunilal, 1,307 Kgs., Rs. 10,912; Pravin & Co., 1,396 Kgs., Rs. 19,035.

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GUM COPAL: From Indonesia: Sphinar Chemical Industries Pvt. Ltd., 10,750 Kgs., Rs. 2,31,467.

GUM ROSIN: From Indonesia: Bhadrachalam Paperboards Ltd., 100 MTs., Rs. 7,44,450.

LAURYL PEROXIDE: From FRG: DCW Ltd., 7,000 Kgs., Rs. 7,19,044.

LINALOL: From FRG: DCW Ltd., 6,000 Kgs., Rs. 13,61,222.

LINALOOL: From FRG: Pond's India Ltd., 2,000 Kgs., Rs. 3,44,000.

L-LYSINE MONO HCl: From Japan: Oscar Feeds, 5,000 Kgs., Rs. 2,72,255.

METHYL ETHYL KETONE: From Singapore: Annapurna Enterprises, 26,560 Kgs., Rs. 1,73,510.

NEO PENTYL ALCOHOL: From USA: Vorin Labs Pvt. Ltd., 10,144 Kgs., Rs. 4,05,477.

NEO PENTYL GLYCOL: From Singapore: Sampada Enterprise, 51,600 Kgs., Rs. 9,50,047.

PARAFORMALDEHYDE: From UK: Rane Brake Linings, 12,000 Kgs., Rs. 1,03,477.

POLYPHENYLENE SULPHIDE: From Singapore: HMT Ltd., 1 MT., Rs. 1,57,007.

PROPIONIC ANHYDRIDE: From Japan: Pradeep Drug Co., 1,000 Kgs., Rs. 47,625.

RED IRON OXIDE NL-20K: From Japan: Fenner India, 25 Kgs., Rs. 5,408.

RESORCINOL TECH. FLAKES: From USA: Vikrant Tyres, 2,000 Kgs., Rs. 1,65,030.

SODIUM TRIPOLY PHOSPHATE: From Japan: Nissho Iwai Corpn., 4 Kgs., Rs. 40.

SULPHODOXINE: From Hong Kong: Plethico Pharmaceuticals, 225 Kgs., Rs. 2,29,838.

SULPHUR: From Canada: E.I.D. Parry India, 4,000 Kgs., Rs. 4,73,742; Shaw Wallace & Co. Ltd., 2,000 Kgs., Rs. 4,25,537.

TITANIUM DIOXIDE: From Singapore: Polycoats Inds., 5,670 Kgs., Rs. 2,72,428.

TRIMETHOXY BENZALDEHYDE: From Netherlands: Savera Labs, 2.5 MTs., Rs. 10,09,415.

DRUG MATERIALS IMPORTED
MADRAS
(From 3.2.90 to 7.2.90)

AMPICILLIN TRIHYDRATE BP: From USA: Alfred Berg Co. Ltd., 400 Kgs., Rs. 4,00,106.

AMPICILLIN SODIUM: From Hong Kong: TTK Chemicals, 100 Kgs., Rs. 1,57,483.

LYSINE MONO HCl FEED: From Korea: Komarla Feeds, 2,000 Kgs., Rs. 1,34,074.

PENTAERYTHRITOL TECH.: From Japan: Coromandel Paints & Chem., 700 Kgs., Rs. 2,07,175.

PHARMACEUTICALS: From Switzerland: World Health Organisation, 219.5 Kgs., Rs. 2,86,472; From Poland: World Health Organisation, 883.2 Kgs., Rs. 13,02,311; From Switzerland: World Health Organisation, 3,264 Kgs., Rs. 29,65,146.

PLASTIC MATERIALS IMPORTED
MADRAS
(From 3.2.90 to 7.2.90)

HDPE: From Korea: Safeguard Packaging Systems, 20 MTs., Rs. 3,10,077; Shyam Textiles, 20,000 Kgs., Rs. 2,08,824; Safeguard Packaging Systems, 20 MTs., Rs. 3,10,079; From Japan: Bharath Trading Corporation, NA, Rs. 2,45,502; From Korea: R.N. Polysack, 40,000 Kgs., Rs. 6,18,092; From Japan: Peacock Polymers P. Ltd., 33.000 Kgs., Rs. 5,47,120.

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HDPE GRANULES: From Korea: Karunnaiammal Poly Inds., 10,000 Kgs., Rs. 1,54,309.

LDPE: From Singapore: K.K. Polycolour Private Ltd., 21,243 Kgs., Rs. 3,74,760.

POLYCARBONATE RESIN: From FRG: Shah Polymers, 15,000 Kgs., Rs. 7,73,615.

POLYPROPYLENE: From Japan: Ponds India Ltd., 15,000 Kgs., Rs. 37,907; From France: Ponds India Ltd., 50 Kgs., Rs. 1,268; From Singapore: Propyfilm Inds., 16,000 Kgs Rs. 2,04,272.

POLYPROPYLENE COSMOPLENE: From Singapore: Propyfilm Inds., 16,000 Kgs., Rs. 1,54,557.

POLYPROPYLENE FILM GRADE: From FRG: Dar International, 7.5 MTs., Rs. 76,904; 7.5 MTs., Rs. 95,464.

POLYPROPYLENE MOULDING RESIN: From Canada: Abco Plastics, 50 Kgs., Rs. 2,068.

PP RESIN: From USA: Rubber Co. Ltd., 30,000 Kgs., Rs. 4,12,576.

PVC RESIN: From China: Kissan Plastics, 40 MTs., Rs. 6,02,471.

PVC RESIN PASTE GRADE: From Korea: Fenner India, 20,000 Kgs., Rs. 4,50,400.

MATERIALS EXPORTED MADRAS

(From 21.2.90 to 26.2.90)

CALCIUM SENNOSIDE: To Bremen: Kothari Phytochemicals Intl., 300 Kgs., Rs. 1,20,972.

CAUSTIC SODA FLAKES: To Basrah: Saumya Exports Pvt. Ltd., 4,40,000 Kgs., Rs. 41,94,042.

HYDROGEN PEROXIDE: To Jakarta: Asian Peroxides Ltd., 103,680 Kgs., Rs. 8,38,304; To Singapore: Asian Peroxides Ltd., 17,230 Kgs., Rs. 1,43,972; To Penang: Asian Peroxides Ltd., 17,280 Kgs., Rs. 1,40,568.

L-CYSTINE: To FRG: Srinivasa Cystine Ltd., 7,000 Kgs., Rs. 22,44,498.

MUSK XYLOL: To Yokohama: Maschmeijer Aromatics (I) Ltd., 200 Kgs., Rs. 23,000.

NATURAL ESSENTIAL OIL: To New York: Bush Boake Allen India Ltd.. 67.5 Kgs., Rs. 87,560.

PHENOLIC RESIN: To Busan: Mercury Indl. Plastics, 15,000 Kgs., Rs. 3,03,849.

SODIUM HYDROSULPHITE: To Barcelona: Tamil Nadu Chemical Products Ltd., 14,000 Kgs., Rs. 2,49,477.

DRUG MATERIALS EXPORTED MADRAS

(From 23.2.90 to 26.2.90)

CISPLATIN: To London: Tamil Nadu Dadha Pharmaceuticals Ltd., 350 Kgs., Rs. 1,18,500.

DRUGS: To Hong Kong: Tamil Nadu Dadha Pharmaceuticals Ltd., 607 Kgs., Rs. 14,700.

IBUPROFEN: To Kuwait: 2,000 Kgs., Rs. 5,25,106.

ISONIAZID BP: To Hamburg: Veer Chemie Aromatics P. Ltd., 2,000 Kgs., Rs. 3,12,200.

DYE MATERIALS IMPORTED MADRAS

(From 24.1.90 to 31.1.90)

SANDOCRYL BLACK: From FRG: Coromandel Leathers P. Ltd., 300 Kgs., Rs. 80,944; Khizaria Leathers, 400 Kgs., Rs. 1,13,267.

SYNTHETIC ORGANIC DYES: From Italy: Coromandel Leathers P. Ltd., 1,320 Kgs., Rs. 58,072.

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Amino Nitrogen	%	3.5	4.2	5.5
Total Protein	%	43.0	55.0	73.5
Water Solution	5%	Clear	Clear	Clear
Copper	mg/100 gm.	–	11.0	14.5
Iron	mg/100 gm.	–	18.0	23.5
Vitamins				
B1	mcg/g	40.0	53.0	70.0
B2	mcg/g	25.0	38.0	50.0
B6	mcg/g	15.0	16.5	21.8
Pantothenic Acid	mcg/g	80.0	112.8	148.5
Niacine	mcg/g	150.0	236.8	313.0

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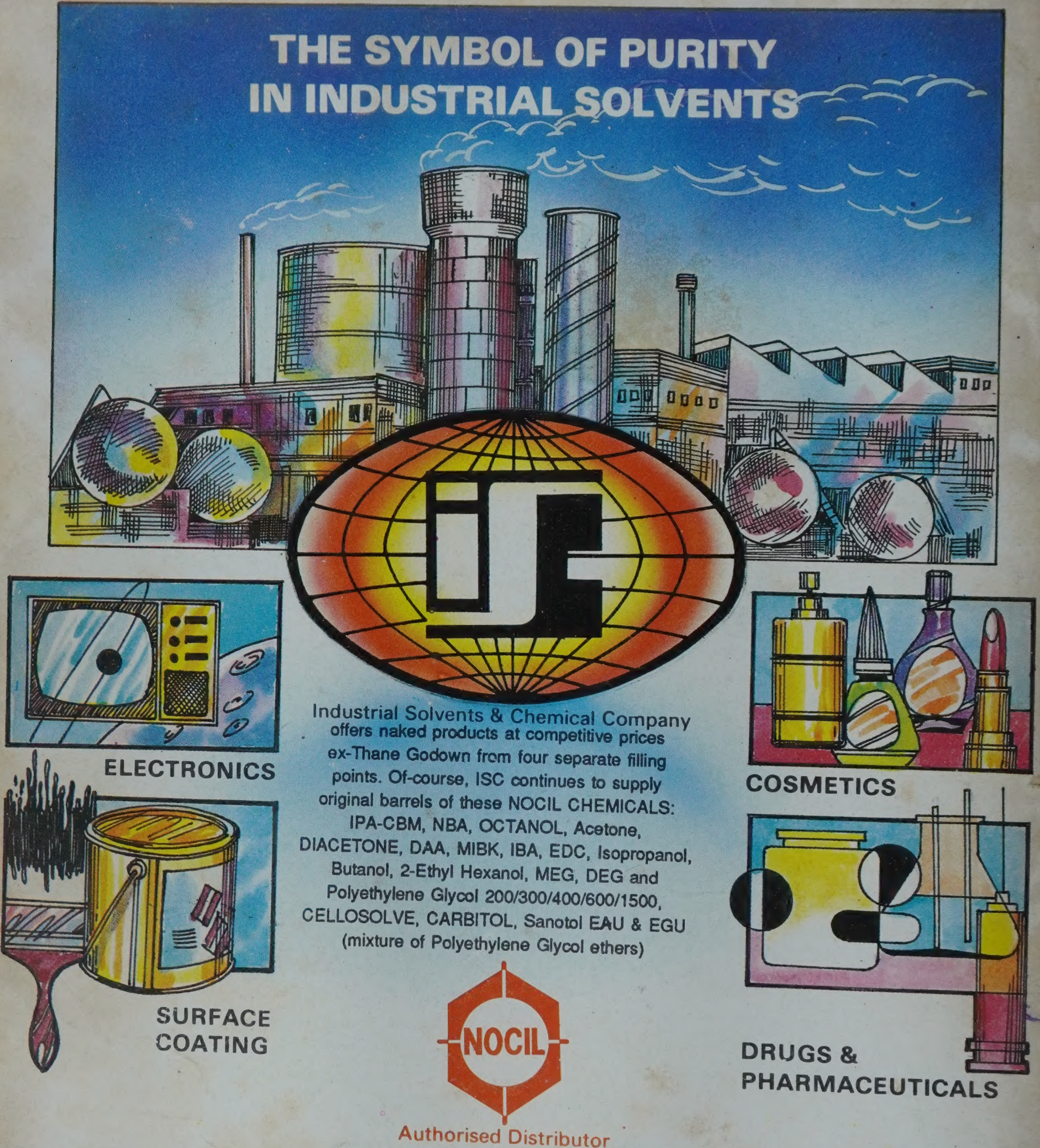

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